


AUGUST 21, 1941

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The **IRON AGE**



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TURRET LATHES

Turn The Tides of War



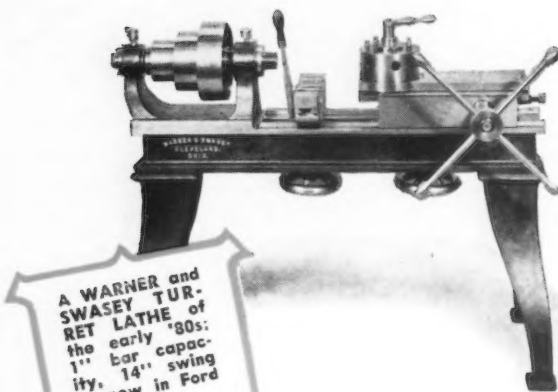
THE NORTH WON THE CIVIL WAR, not because its soldiers were braver, but because the North had the machines to produce armament. The addition of a turret to the simple metal turning lathe was a big factor in mass production of parts for rifles and shells. After the war, the turret lathe played a leading part in the industrial advances of the 'eighties.



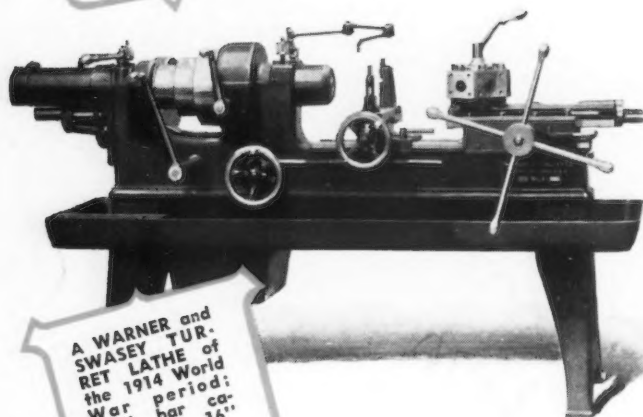
THE WORLD WAR OF 1914 found America with turret lathes capable of taking full advantage of high speed steels in the competitive race for war requisites. America's productivity swung the scales to an allied victory.



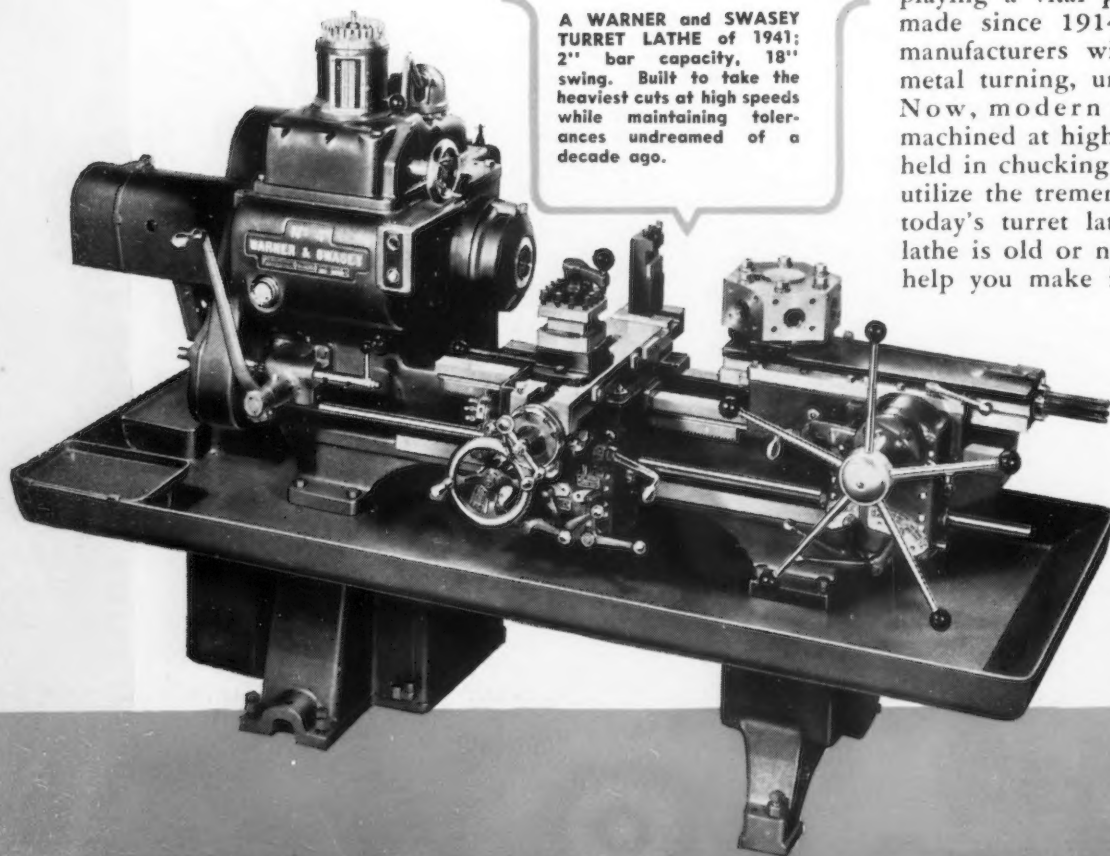
AGAIN, IN 1941, Turret Lathes are playing a vital part. Steady improvements made since 1914 now provide American manufacturers with power and speed for metal turning, unsurpassed by any nation. Now, modern tough alloy steels are machined at high speeds by carbide cutters held in chucking and bar tools designed to utilize the tremendous power and speed of today's turret lathes. Whether your turret lathe is old or new, Warner & Swasey can help you make it more productive. Write



A WARNER and SWASEY TURRET LATHE of the early '80s; 1" bar capacity, 14" swing — now in Ford Museum.



A WARNER and SWASEY TURRET LATHE of the 1914 World War period; 1 1/2" bar capacity, 16" swing.



A WARNER and SWASEY TURRET LATHE of 1941; 2" bar capacity, 18" swing. Built to take the heaviest cuts at high speeds while maintaining tolerances undreamed of a decade ago.



AUGUST 21, 1941

VOL. 148, NO. 8



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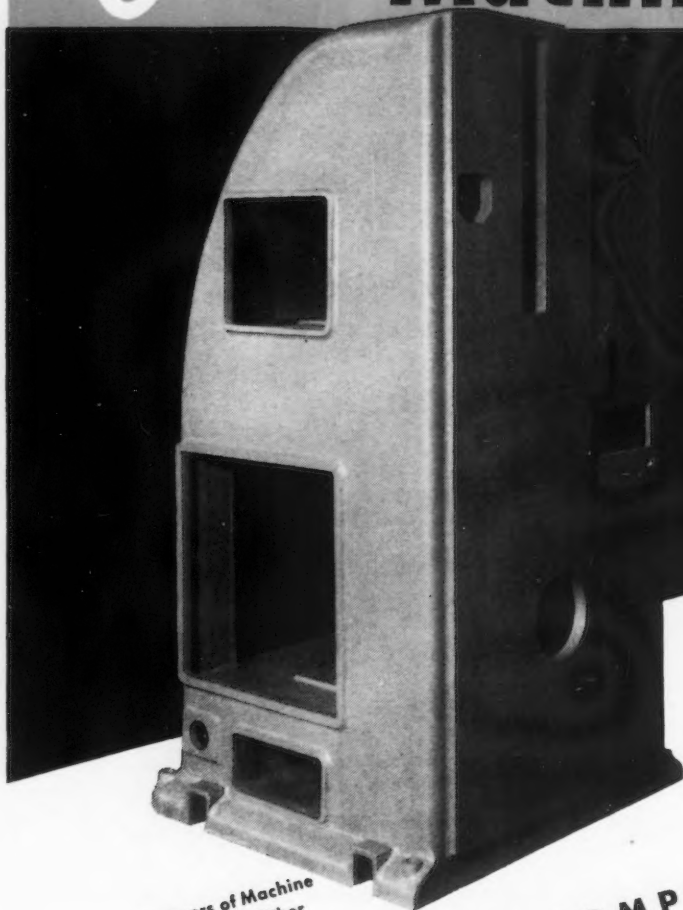
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In the Machine Base to the left note the clean cut, smooth edges of the slot and circular orifice, skillfully done with a flame cutter in the hands of an expert operator... also, in the Base below, the number of openings achieved without sacrifice of strength.

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THE IRON AGE

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AUGUST 21, 1941

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ESTABLISHED 1855



Nothing But Elephants

ONCE upon a time, the head man of a zoological garden determined to make a market survey to determine customer interest. He had tabs kept on the attendance at the elephant house, the monkey house, the bird house and all of the other varied departments.

So he conceived a big idea. Said he: "We will double the number of elephants and do away with the small fry. Then you will see our attendance records go up by leaps and bounds."

It was so ordered and done and at first it seemed as though the big idea had also been a bright one. But shortly attendance began to dwindle. People, it seemed, grew tired of seeing nothing but elephants. Whereupon the head man revised his policy and coined the phrase: "Variety is the spice of life."

Will we come out of our defense program with an industry composed very largely of elephants? Consider what is happening to the smaller industrial concerns which have not been in a position to get or to handle defense orders. They are being ground not merely between an upper and a lower millstone but are being passed through a whole succession of grinding operations.

First, their skin is being removed through the operation of priorities, which prevents them from getting the materials and tools that they need to do business. Next, they are being flayed through the establishment of price ceilings. These bear down more heavily on the small than on the large producing units since the latter are usually more efficient and better heeled.

Next, they are being penalized in the labor market since they have no escalator clauses to help them keep pace with wage rate rises.

And now in the new 1941 revenue bill (H.R. 5417)* one finds a "joker" in Section 204(e) that may easily put the finishing touch upon many a small enterprise.

This innocuous appearing clause would undo the beneficial provisions of the Excess Profits Tax Amendments of 1941 (H.R. 3531), enacted only a few months ago, which allowed a carryover of a deficiency of earnings of one year against the income of the following year in arriving at current excess profits taxes.

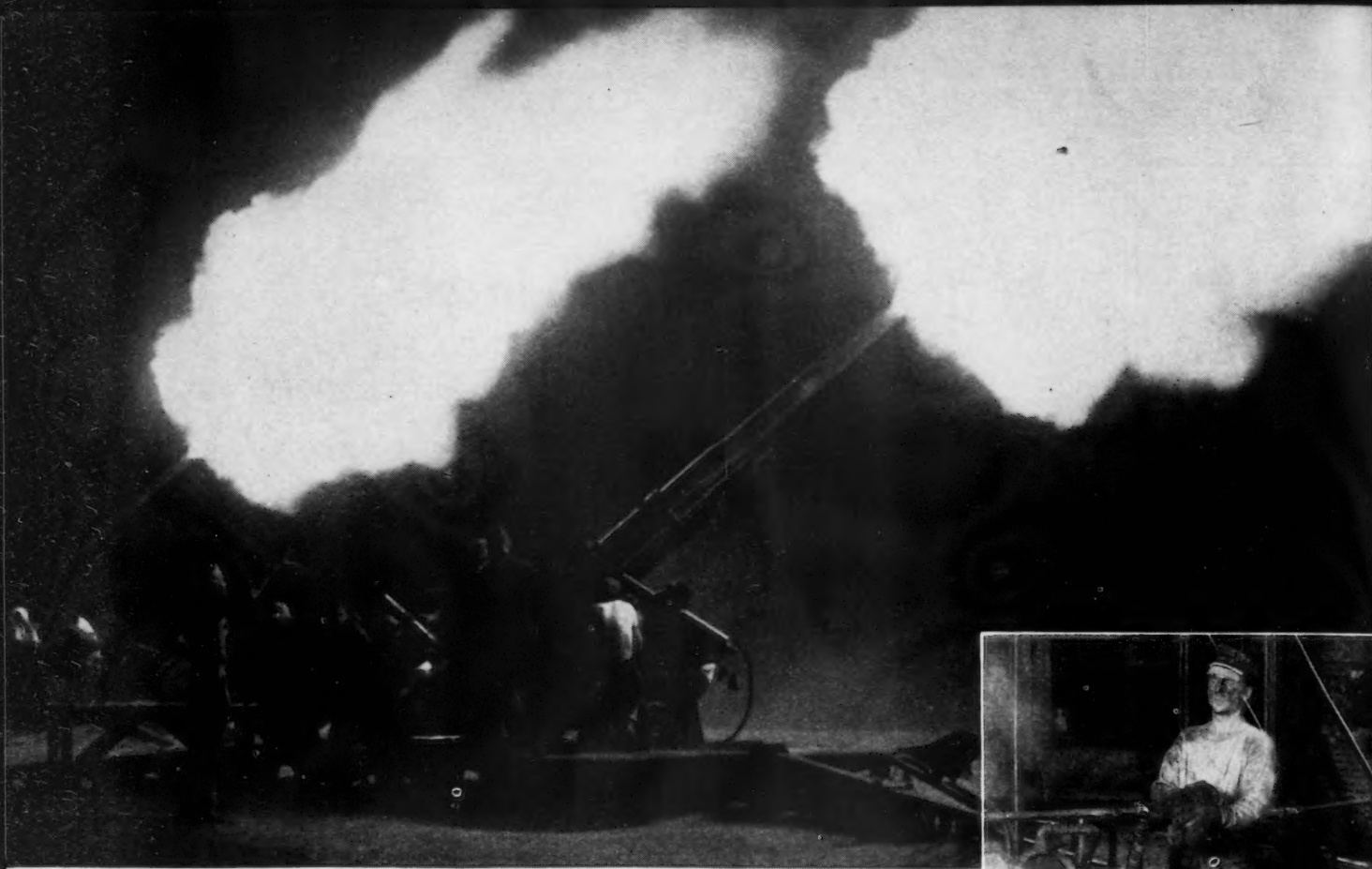
Unless Section 204(e) is struck from the present pending bill, those concerns (and they will be principally the smaller ones) which could not take advantage of an excess profits credit in 1941 will be heavily penalized. For they will have to pay a heavier tax on average earnings for 1940 and 1941 than will more prosperous concerns which can take full advantage of a 1940 credit.

No wonder then that Washington regrettably predicts hardships for the small industrialist and intimates that the coming business casualty lists will include a good many of them.

It will be too bad for the future of America if we come out of this with nothing left but elephants.

* See "The Joker in H.R. 5417", page 91 of this issue.

J. W. Van Dusen



Shells for Defense

Another Example of How Inland Steel Is Used in the Preparedness Program

Numerous plants throughout the United States are busy manufacturing enormous quantities of artillery shells—shells needed for the defense of America. Flowing from the Inland mills is steel from which thousands of these shells are being forged.

Inland has never been a producer of munitions; nor has it made steel for munitions in times of peace. Inland manufactured no steel for war purposes between the close of hostilities in the First World War and the outbreak of the present war.

But today, with the same spirit exhibited by all American industry, Inland is doing its part by making steel, in whatever form required for our National Defense Program, to the limit of its manufacturing facilities. This is Inland's No. 1 job!



When forging one size of field artillery shell, a 50-lb. billet is heated in a continuous furnace. The billet is quickly descaled and pierced, then follow two fast drawing operations. Above is shown a shell after the first draw.

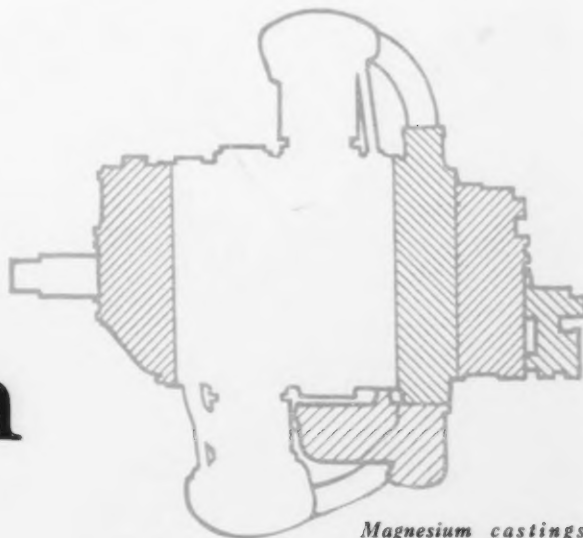
**SHEETS • STRIP • TIN PLATE
BARS
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STRUCTURALS
RAILS • TRACK ACCESSORIES
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*Fluxes and temperatures employed,
sand characteristics, and molding
and handling practices in the
world's largest foundry for*

Magnesium Aircraft



*Magnesium castings
(indicated by shaded
areas) find wide use in
aircraft engines, as
this sketch of a Wright
engine shows.*

Castings

A MONUMENT to the practical success of the intensive research work done in recent years on magnesium castings is the new foundry of Wright Aeronautical Corp. at Fairlawn, N. J. Located adjacent to the company's recently opened aluminum foundry, this new plant is the world's largest magnesium foundry and the only one devoted solely to the production of aircraft engine parts.

From a dimensional viewpoint this new foundry is not massive when compared with other types of foundries built recently. However, when judged from a capacity viewpoint the new plant assumes proportions of unusual magnitude. When in full operation, which will probably be some time late this year, the foundry will turn out 20,000 lb. of castings a day, or as much magnesium in eight months as was produced in all forms by the entire magnesium industry in the year 1938.

The foundry, completed in 93 working days, is a fire-proof building 700 ft. long by 200 ft. wide and embraces 113,000 sq. ft. of floor area. When it is working at capacity, about 650 men will be employed. At present 350 men are working three shifts a day, six days a week, and more are being added daily.

Current shipments from the plant are about 50,000 lb. a month, with the total rising rapidly.

Output of the foundry ranges from pieces weighing as little as 8 oz. to parts as heavy as 84 lb. (shipping weights; pouring weights would be 3 to 4 times greater), and covers some 150 different types of castings. Chief production items at Fairlawn are engine nose sections, oil sumps, supercharger rear covers,

• • •

By W. A. PHAIR

Associate Editor, *THE IRON AGE*

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oil system breathers, supercharger front and rear sections, accessory drive housings and covers, tachometer drive housings, pump covers and miscellaneous small plates and covers.

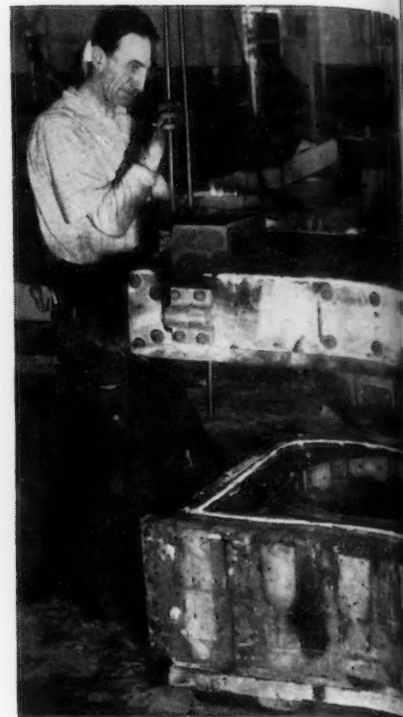
Full utilization of the favorable weight and strength characteristics of magnesium alloys has been restricted somewhat by the inflammatory nature of molten magnesium. The problem at Fairlawn was that of converting successful laboratory methods into practical plant procedures which, while permitting production on a large scale, also assured safe and efficient operations.

While the better understanding of magnesium gleaned from extensive research work has been successfully translated into practical control methods as this new plant attests, handling molten magnesium still requires a technique somewhat akin to placating a Brahma long horn with a sand burr under its thigh.

The latest addition to the Wright foundries is characterized by the same design philosophy apparent in other plants built recently by the company. Briefly, this philosophy is one of utilizing mechanized



Molding the core for a supercharger.



Closing a green sand

methods to the fullest extent when mechanization is more efficient, but not hesitating to use hand methods in important operations when hand work is more efficient.

While it would seem that this theory of plant design should be fundamental in all plant construction, it appears to have been over-

looked in many instances lately where designers have mechanized purely for the sake of mechanization.

There is more hand work performed on Wright's magnesium castings than is usual in such a production plant, but this use of hand work has been made such an in-

tegral part of the production scheme and is so intelligently supported by mechanical equipment that it is doubted whether it would be possible to achieve the same net effect in any other way.

Probably the chief operating problem in any magnesium foundry is that of preventing oxidation of

Covering flux is applied as the metal is poured into the mold.



Gates and risers are removed





mold of a nose section.



Magnesium is melted in 100-lb. oil-fired crucibles.

the metal, which can occur on the slightest provocation (and it seems at times apparently without provocation).

Fluxes Important Factor

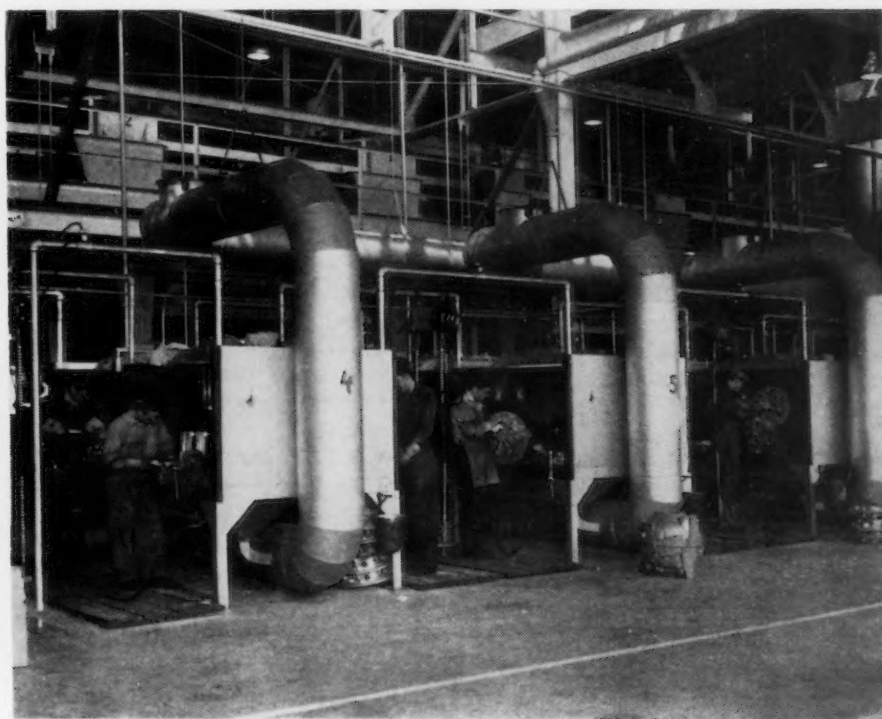
Simply stated, prevention of fires in magnesium foundries rests upon availability of good fluxes and rigid

controls over melting and pouring operations. Three fluxes are used at Fairlawn; two for melting and one for remelting. In addition, an inhibiting agent is used in cores and molding sand. One melting flux consists of magnesium chloride and calcium fluoride and is primarily a covering agent, or solvent, for the

oxides and nitrides which form when the metal is in contact with the air. The second melting flux contains sulphur and boric acid and is used solely for pouring. The remelt flux, which contains potassium chloride and magnesium chloride in approximately equal amounts, acts as a purifying agent

from castings by band saws.

Flexible shaft machines are used for burring and snagging.



as well as a covering agent. The inhibiting agent consists of sulphur, boric acid and ammonium borofluoride and is known commercially as Dow Chemical agent No. 12. Application of the flux on the molten metal, the ladles and the gates and risers is by means of a shaker similar to the type used for sugar dusting in a bakery. About 5 lb. of flux are used to each 100 lb. of magnesium melted.

Melting equipment at Fairlawn consists of 48 oil-fired furnaces, of which 28 are 100-lb. crucible furnaces, 14 are 500-lb. holding units for clean scrap and six are 500-lb.

For other detailed data on magnesium castings see the article "Magnesium Sand Castings," by N. M. Briskin, THE IRON AGE, July 10.

furnaces for remelting dirty scrap. All dirty scrap is melted and pigged before being added to a new batch. Virgin metal is received in the ingot form, already alloyed. No alloying is done at the foundry.

Because of the nature of magnesium, the percentage of returns from gates and risers runs somewhat higher than in ordinary foundry practice. For example, a supercharger cover weighs about 168 lb. as it comes from the mold, but is pared down to only 65 lb. by the time it is ready for shipping. Actual metal loss in the melting operations is of the order of 8 per cent.

Metal Poured at 1450 Deg. F.

In starting a new batch, the new metal is placed in the crucible and remelted metal is taken from the holding furnaces and added to the new ingots at the rate of $3\frac{1}{2}$ ladles of remelt material to each new ingot. (Each ladle holds 50 lb.) This mixture is then brought up to 1600 deg. F. and held there until ready to pour. When ready for pouring, the crucible of molten metal is removed from the furnace shell and is backed down to around 1450 deg. F., and then promptly poured. This cooling is performed in angle iron stands and is subject to careful supervision by means of pyrometers. Remelt metal is held at 1220 deg. F. in the holding furnaces.

All pouring at Fairlawn is done directly from the crucible and is largely a hand operation. This is

due partly to the fact that handling a crucible of magnesium does not present the same weight problems as a ladle of brass or iron; and, too, hand pouring is found to be subject to more sensitive control. Another factor is the desire to avoid rehandling of the metal as much as possible to minimize the surface area exposed to the air. The crucibles are built of high grade boiler plate and have no linings. The fluxing practice at Fairlawn is quite similar to general magnesium foundry procedure, as far as the application and handling are concerned.

The metal now in use at Fairlawn is the regular Dowmetal H grade which averages 6 per cent Al, 3 per cent Zn, 0.2 per cent Mn, 0.5 per cent Si, other impurities 0.3 per cent, and balance Mg. Experiments are under way with a higher zinc content of step up fluidity, but this is still in the experimental stage. As-cast strength of this metal is around 27,000 lb. per sq. in., while heat treatment and aging bring this up to 38,000 lb. Yield strength, after heat treatment and aging is in the neighborhood of 19,000 lb. per sq. in. Every heat poured has a test bar, and no processing of a heat is permitted until the analysis of the heat is returned from the laboratory attesting to the quality of the metal. Every casting has a tag dropped in the riser during pouring containing the heat number. After shakeout, this number is transferred to the casting proper by stamping to give permanent identification.

Sand Closely Controlled

Chief feature of the sand practice at Wright is the extremely close control exercised over all phases of sand preparation and the 100 per cent reclamation of used molding sand. Shakeout and sand preparation departments are located side by side at one end of the plant. Molding sand is distributed via overhead conveyor belts, while core sand is transported to bench hoppers in narrow gage dump trucks running on a superstructure above the benches. Mixing of the sands is done with intensive mullers.

All molding mixtures are based on No. 80 Millville silica and Pennsylvania glass sands. The molding mixture now in general use on both light and medium work is built up of the following:

900 lb. reclaimed sand
54 lb. silica sand
54 lb. glass sand

$\frac{1}{2}$ lb. sulphur
 $1\frac{1}{4}$ lb. ammonium borofluoride
1 lb. inhibiting agent
 $3\frac{1}{2}$ lb. Bentonite
3.6 per cent moisture

Green permeability of this mixture runs between 65 and 70, with dry permeability rated at 115 to 120. Green compression strength is between 4.7 and 5.2. No facing sand is used, the regular mixture providing a sufficiently fine surface. General practice is to ram softly and use very few vents, except to exhaust large pockets.

Considerable study of gating and risering practice has been made by Wright's technicians to develop a standard practice for both aluminum and magnesium. From these series of standards have been established a summary of some of the more interesting sections of which as they apply to magnesium work follows:

In gating, the pouring basin is at least 6 in. long, whether cored or green sand, and only offset basins are used. Sprues are all flat, $\frac{1}{4}$ to $\frac{5}{16}$ in. thick and $\frac{1}{2}$ to 3 in. wide. Sprues are offset when passing through a parting.

When changing small and medium castings from aluminum to magnesium, sprue and gate area is increased 10 per cent; in converting large castings, the increase is 20 per cent. All magnesium castings are gated for external ring runners.

Total area of all runners is twice the sprue area, length between sprue and nearest gate being 10 in. or more. In major castings the runner is at least 2 in. from the side of the flask, while in small castings, it is at least 1 in. from the side. Thickness of runners varies from $\frac{3}{16}$ to $\frac{5}{16}$ in.

Bottom gating is used wherever possible and all gates lead from the bottom of the runner. Gates are flared into the casting and runner. Fillets are used with a radius of $\frac{1}{2}$ to 1 in. Patterns are built with a $\frac{1}{8}$ -in. shrink rule.

Chills Are Sprayed

Chills are all of cast iron, $\frac{1}{4}$ to $\frac{3}{4}$ in. wide. For finished surfaces chills are vented by a central hole with radiating grooves, or by parallel grooves alone. Before using, chills are sprayed with a mixture consisting of 4 lb. of paraffin wax dissolved in 4 gal. of carbon tetrachloride. Very little nailing is permitted.

A sheet of newspaper is placed

between the cope and drag of all molds to keep the mold free of dirt and is destroyed by the molten magnesium during pouring. Strainers are not used except on three or four special jobs, and the ultimate aim is to completely eliminate all such devices. Considerable experimental work was necessary to develop the correct gating practice to do away with straining. Generally speaking, the discarding of strainers was possible through the employment of very thin gates with heavy headers to provide sufficient head pressure.

Large work is molded on roll-over bumper jolt vibrating draw machines and is run off onto spring mounted conveyors for core setting and closing. The molding bay is arranged with large work along one side and small bench work along the opposing side, with the melting units in the center.

Two types of core and sand mixtures are used, one for body cores and one for softer interior cores which must collapse. Mixtures of these sands are as follows:

Body Core Mixture

50 per cent silica sand
50 per cent glass sand
24 lb. sulphur
3 lb. Mogul oil

6 pt. Hyten oil
9 per cent moisture

Interior Core Mixture

100 per cent silica sand
24 lb. sulphur
8 pt. Hyten oil
7 per cent moisture

All cores are sprayed with an inhibitor to prevent oxidation of the metal during pouring. Baking is done in continuous oil fired units and requires 7 hr. 10 min. at 425 deg. F., followed by a forced air cooling in a specially constructed tunnel. After the primary baking, the cores are sprayed with a 20 per cent solution of Dow No. 12 (ammonium borofluoride) and pass through another series of ovens, drying at 325 deg. F. for 90 min.

Removal of gates is accomplished on a band saw. Large castings are cleaned on blast tables, while small work is handled by Wheelabrators using steel grit. Immediately following cleaning, the castings are tested for leakage. This testing includes soaking for 4 to 8 hr. in hot water to accelerate oxidation around defects for the purpose of easy identification. Testing is done in cold water with air applied to the cavities under 25 lb. pressure, bubbles showing the location of the leaks.

Burring and snagging is done with flexible shaft wheels at benches with individual exhausts to carry away the highly inflammable magnesium dust. Finish machining is done in plant No. 2.

Following the snagging operations, the castings are subjected to a dichromate dip to prevent corrosion while in process. This dip gives the castings a corrosion resistant surface, somewhat similar to an anodized treatment. The dip consists first of a wash in a bath of nitric acid, sodium dichromate and water, followed by a wash in cold water, then a hot wash and a dip in slush oil.

Heat treating is carried out in new continuous, conveyor type electric ovens. Treatment consists of 2 hr. at 620 deg. F., 6 hr. at 650 deg. F., 12 hr. at 729 deg. F., and 2 hr. in the cooling zone. Aging treatment consists of 16 hr. at 360 deg. F.

Magnesium dust, if not handled properly, is as much a hazard as molten metal itself. The policy at Fairlawn is to prevent excessive accumulation of dry dust by keeping all exhaust pipes clean and wetting the dust as soon as it hits the accumulators.

Conveyors Speed Malleable Casting Cleaning

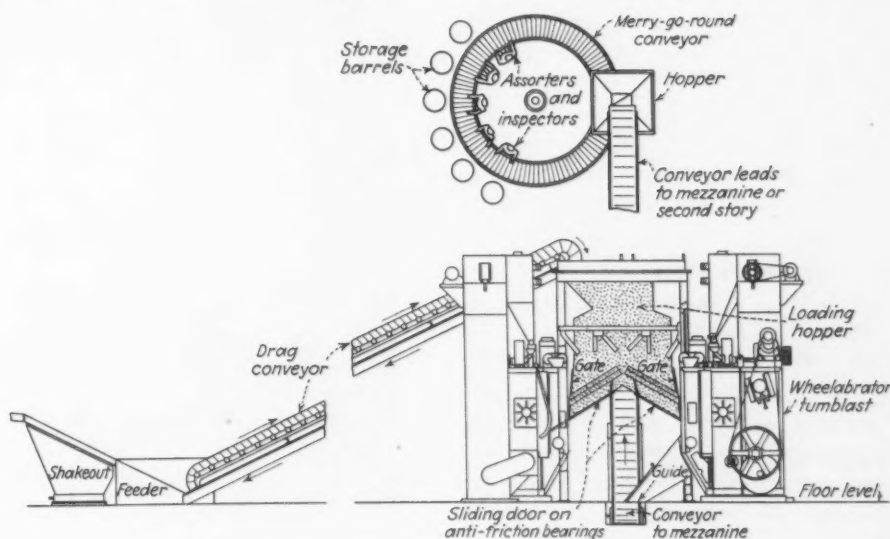
THE ingenious conveyor arrangement shown in the accompanying sketch is utilized by Walworth Co., Greensburg, Pa., to reduce time required to clean its output of malleable fittings. Upon leaving the annealing ovens, castings are dumped into a vibrating shakeout screen, which in turn passes them onto the feeder of a continuous conveyor. This conveyor elevates the castings to a loading hopper located between two 48 x 42 in. Wheelabrator Tumblasts.

Castings are fed by gravity, under manual control, to either of the two Tumblasts as desired. After cleaning, they are dumped through a chute onto another conveyor which carries them up to the mezzanine. Here they pass into a hopper which feeds onto a revolving table where they are inspected and

assorted and deposited into containers for trucking to shipping room or galvanizing department.

Usual load for each machine is about 1700 lb. of assorted sizes.

Cleaning time ranges from 4 to 5 min. for large pieces and a maximum of 15 min. for small castings. No. 25 steel shot is used for abrasive.



Oven Expedites Treating of Bars

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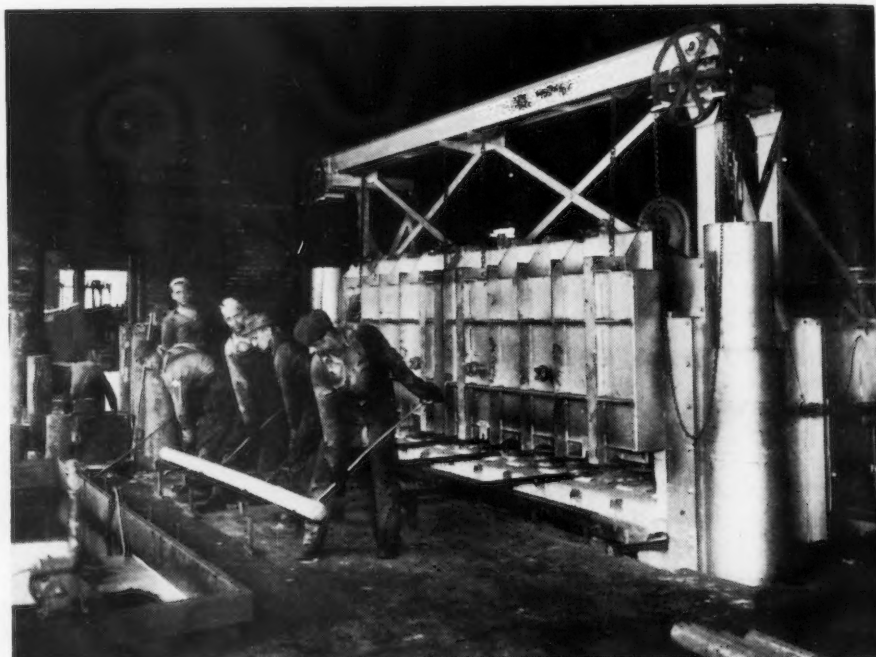
HIGH pressure demands of the national defense program have made time losses intolerable, and the George H. Porter Steel Treating Co., Cleveland, points out that glaring delays often occur in loading and discharging bar heating furnaces, there being also consequent warpage on long bars.

Production has now been stepped up through a two-fold program: (1) Semi-automatic loading and unloading; (2) a new Lee Wilson bar heating furnace with side doors and protective gas shield at the door to prevent furnace temperature drop.

Through the use of side rails, loading and unloading are now simply rolling operations. T-rails at the side of the furnace are raised to a 3 per cent angle and the bars, irrespective of size or weight, are rolled into the furnace. When unloading, the bars are lowered to the proper angle which will ease the bars from the furnace downward to the adjacent oil quench.

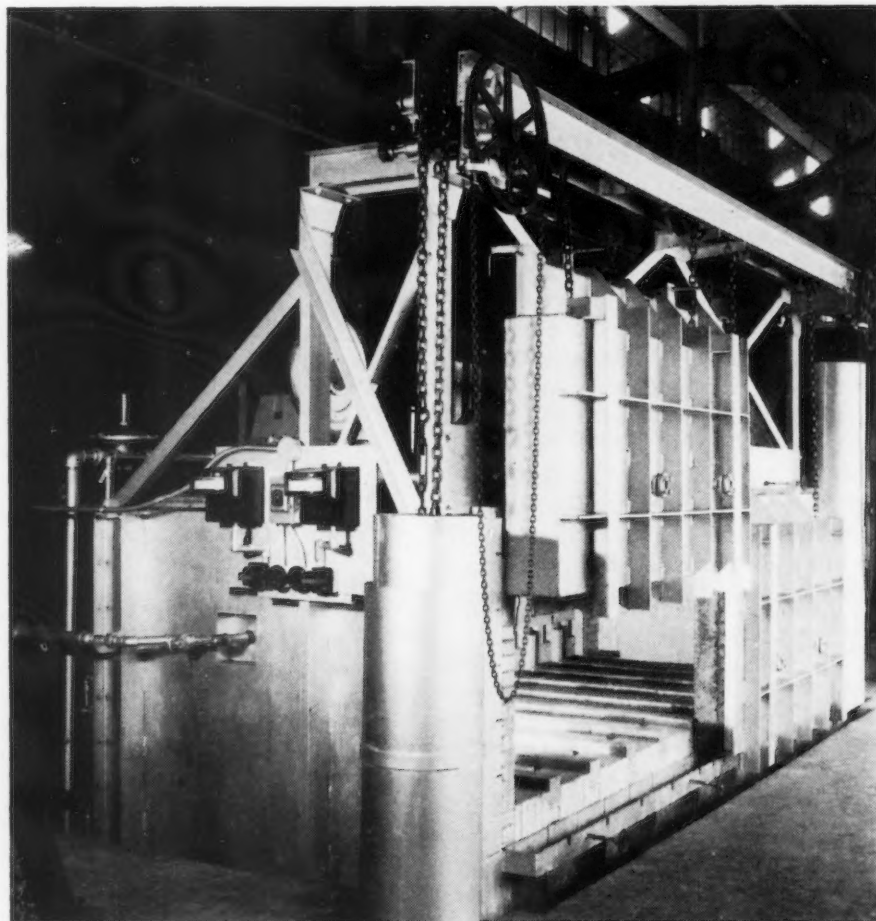
It is possible for one man to load and unload the new furnace, although in actual practice two or three are used. The furnace is 14 ft. wide, 54 in. deep at the loading hearth, and is 30 in. high at the door. It has 10 gas-fired burners. North American standard burner equipment is used, equipped with pilot lights. The protective curtain formed by the products of combustion in front of the door has greatly reduced heat loss, according to George H. Porter, general manager of the company.

The furnace can be used for hardening, normalizing and tempering. Wheelco two-zone control is employed. The new furnace has handled as much as 8880 lb. of bars without decking, and it generally produces two heats per day. On one occasion with three men unloading, the furnace was emptied in 15 min.



UNLOADING bar from new Lee Wilson heating furnace at the George H. Porter Steel Treating Co., Cleveland. Rails between side door of furnace and the quenching tank speed production. Gas shield at furnace door prevents temperature drop.

BELOW
View of controls and side door of new furnace.



ETCHING TECHNIQUE

—In which the author submits a number of interesting observations based on many years' work, sets down the theory of etching, and presents informative data on the application of neutral ferric chloride solutions to the etching of nickel and its alloys.

By M. G. CORSON

Metallurgical Consultant, New York

THERE are two books, one in English and another in French, which are entirely devoted to the technique of metallographic etching. The latest of them, by A. Portevin and P. Bastien (1937), lists some 220 etchants used by various metallographers in the study of ferrous and non-ferrous metals.

Needless to say, these authors do not recommend any particular reagent nor do they discuss the results obtainable, and for these reasons the two books look more like pharmacopoeias or cooking recipe books laboriously compiled but of very little help to the working metallographer. For example, a metallographer should just try and select out of 100 odd etching solutions for copper alloys one that would give decidedly superior results.

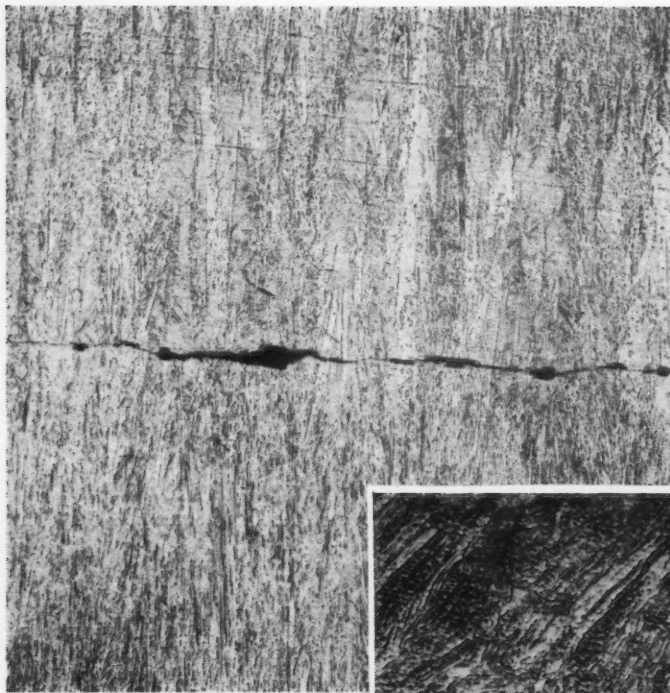
The problem of getting hold of a really good etchant for a given class of work is, theoretically speaking, quite hopeless. There are so many reagents that will etch a given alloy, so many levels

of temperature, intervals of time, possible concentrations and states of the polished surface, that a systematic investigation cannot even be undertaken. Therefore, if someone suggests a one per cent solution of picric acid in alcohol or a certain solution of ferric chloride and hydrochloric acid in water, it does not mean at all that the author actually compared these reagents with others or definitely established the optimum concentrations. Most likely every reagent proposed forms the result of a single experiment which pleased its originator. And, such is the main reason why 220 odd etchants are listed in the book by Prof. Portevin.

The prerequisites of a good etchant: It might be desirable to consider what requirements a good etching medium must satisfy. Needless to say it must reveal a structure that is pleasing to the eye—this is the first and almost only way of approaching an etched surface. The picture which the metallographer intends to examine

must be clear, clean, contrasting, and to a great extent should show exactly what he intends to see. Besides it must be obtained fairly rapidly.

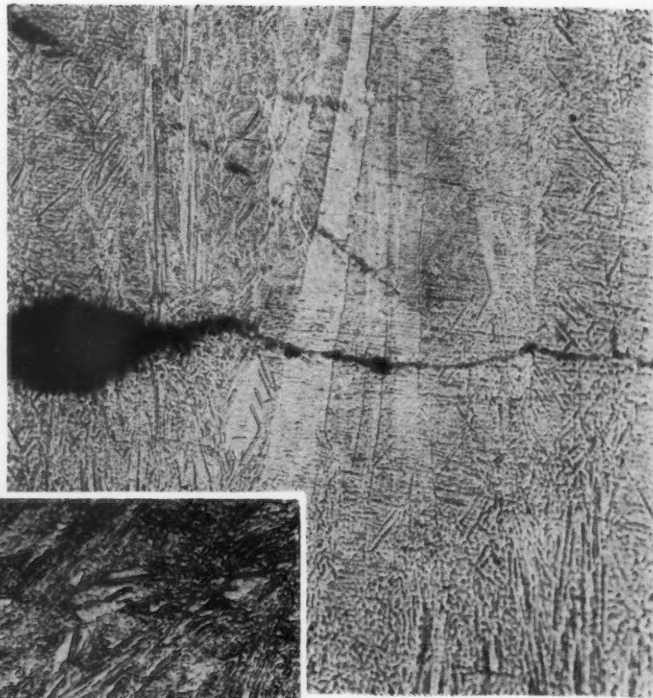
Etchants that fulfill these requirements are well known for the majority of industrial metals and alloys. Excellent pictures can be secured of pearlitic or martensitic steels using picral of almost any concentration. Just as beautiful are the pictures obtainable by other etchants for brasses, tin bronzes, aluminum alloys, etc. On the other hand, most of the etchants suffer from the defect of being uncontrollable. A short dip followed by good washing and drying produces a good etch if skillfully executed. However, if the metal is etched for a fraction of a minute longer the section must be repolished, because the features become blurred and in many cases pitted as well. Of course, most of the pits are not pits at all, but small pyramids which remained because they were protected by gas bubbles while the metal around was being etched



ABOVE—Fig. 1. Cathode nickel, at 100 diameters. Shows the boundary between the starting sheet and the remainder of the cathode. Note the continuation of crystalline features from the first to the second.

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BELOW—Fig. 4. Cathode nickel, cold rolled 20 per cent and annealed at 125 diameters.



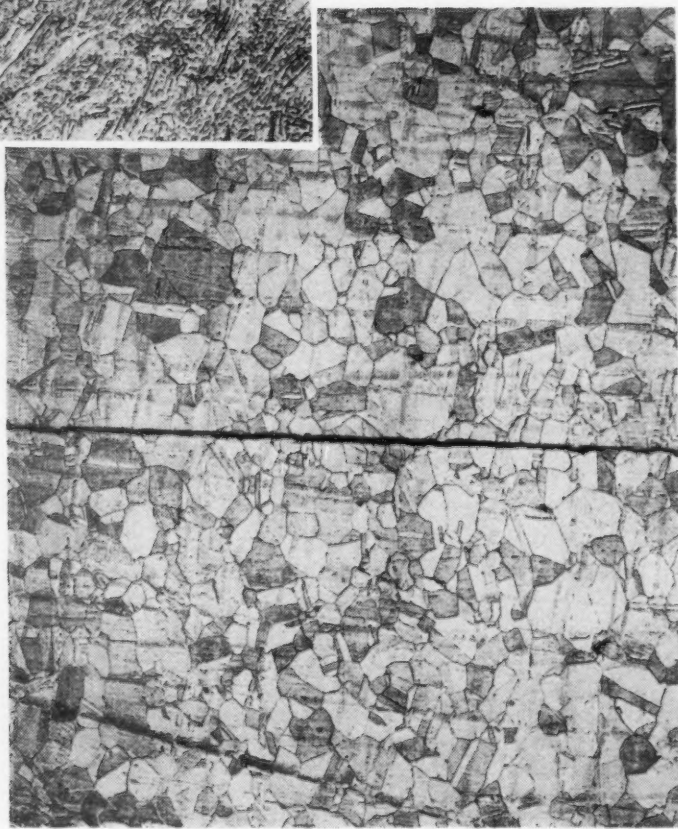
ABOVE—Fig. 2. Same as Fig. 1, but at 500 diameters.

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CENTER — Fig. 3. Cathode nickel cold rolled; at 500 diameters.

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BELOW — Fig. 5. Cathode nickel which recrystallized by annealing at 800 deg. C. at 100 diameters.

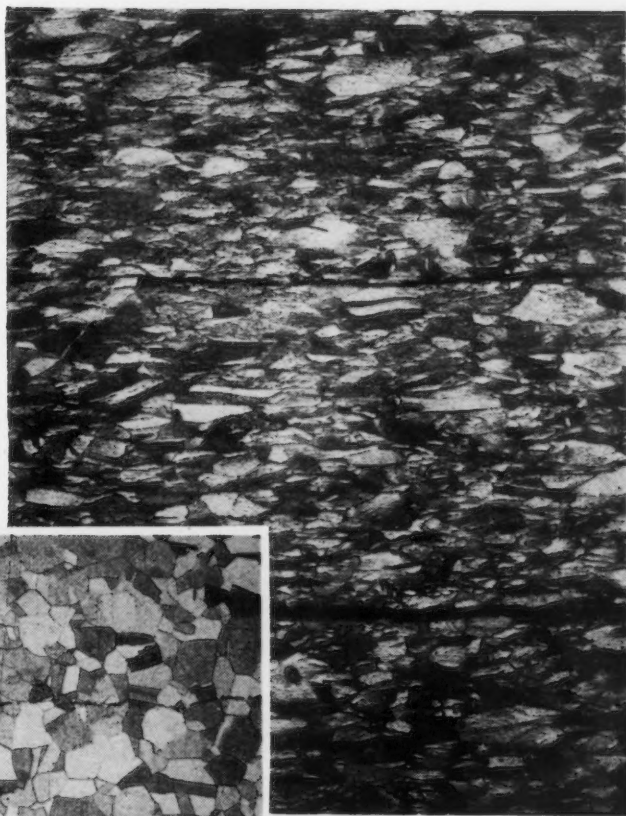
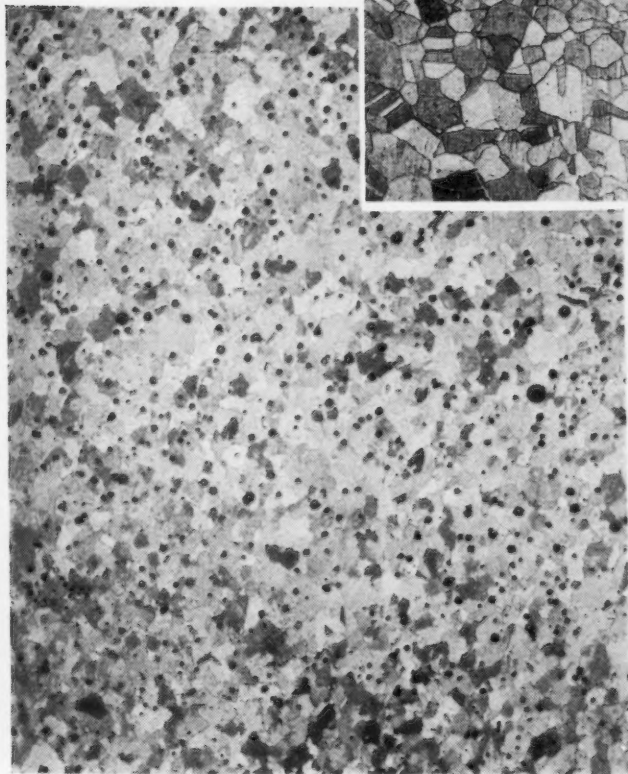




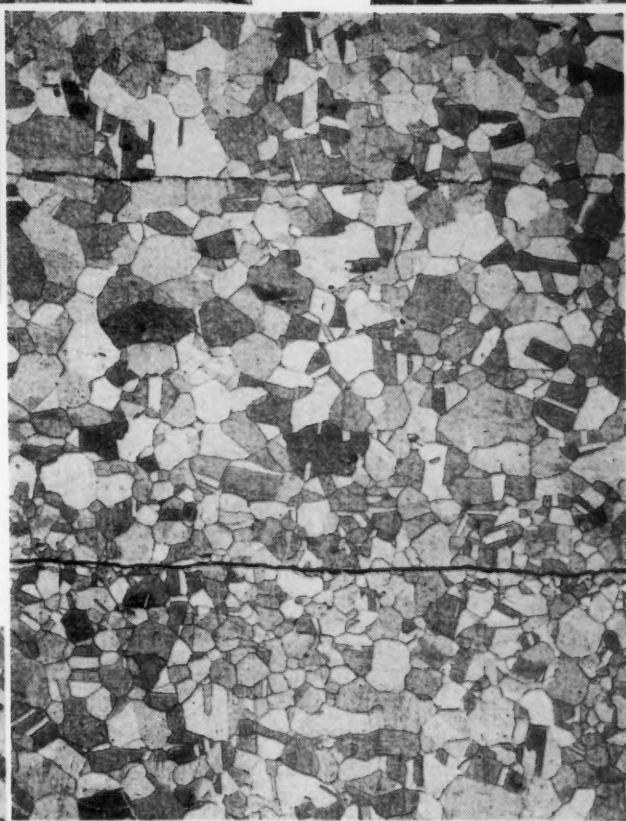
ABOVE—Fig. 6. Same as Fig. 5, but at 500 diameters.

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BELOW — Fig. 9. Commercial nickel; $\frac{3}{4}$ in. rod, annealed. The grain size is well defined, in spite of numerous black dots. At 100 diameters.



ABOVE—Fig. 7. Cathode nickel annealed at 800 deg. C. and cold rolled 50 per cent at 100 diameters.



CENTER—Fig. 8. Cathode nickel, annealed at 800 deg. C., cold rolled 50 per cent and annealed again at 800 deg. C. at 125 diameters.

BELOW—Fig. 10. Same sample as in Fig. 9 but unetched. Shows that the black dots correspond to something that was in the metal and certainly are not etching pits.

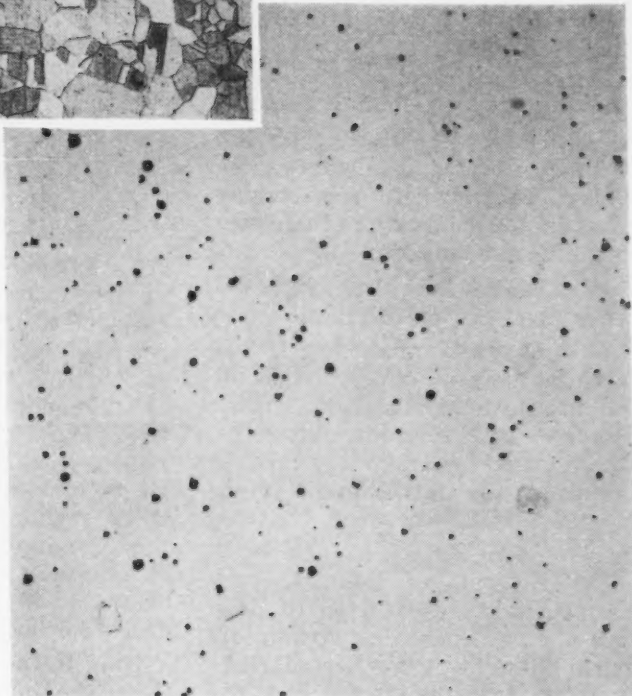




FIG. 11—Commercial rod of a nickel-beryllium-chromium alloy containing some carbon at 100 diameters. Annealed at 950 deg. C.

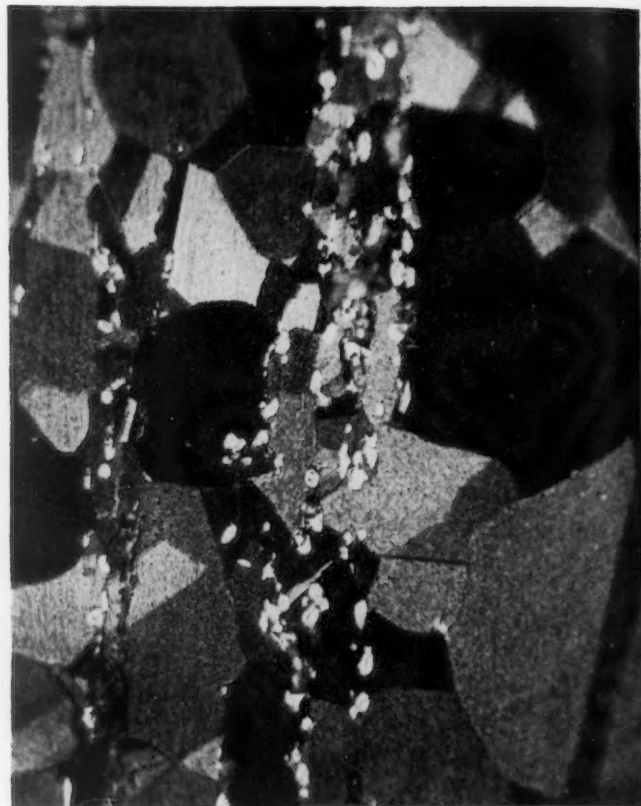


FIG. 12—Same as Fig. 11 but at 500 diameters. Axial region of the longitudinal section. Shows stringers of chromium carbide.

away. Besides, the beautiful picture which is seen after a skillful but short etch is rarely telling the whole story. Sharp and clear as it is, it does not reveal a number of features which require a long etch. And the majority of etchants, especially those containing hydrogen ions, do not permit a prolonged etching at all.

Three types of etchants: In general the existing etching reagents can be subdivided into three groups, namely:

(1) Those where the etching effect is due primarily to their content of hydrogen ions.

(2) Those where the etching depends upon the hydroxyl ion.

(3) Reagents producing a differential staining effect, the chemical nature of which is still most obscure. To this group belong the picrates used to darken iron carbide in steels, the ferricyanides used to differentiate between various carbides, etc.

The reagents of the first two groups might be expected to produce pictures consisting strictly of sharp lines, i.e. grain boundaries, twinning trace lines, outlines of

secondary constituents, and inclusions. Sometimes they actually do just that; however, in the majority of cases they produce a staining effect in addition. The metallographer is inclined to describe the result as fine pearlite, sorbite, troostite, bainite, martensite in steels; or, when the beautiful staining effect is obtained in brasses, aluminum bronze, silicon bronzes, etc., the visible grains are called "polyhedra"—as if etching were capable of bringing out each granule in relief—showing its outer surfaces, not merely cross-sections.

The fact is that all these beautiful shadings, etc., are merely stains properly placed by the etchant upon the surface of the sample. A slight repolishing on velvet, using a dilute solution of soap with no abrasive at all eliminates these stains entirely, leaving behind mere outlines. Again, in the case of copper-base alloys of the alpha type, etching with ammonium persulfate solutions produces *only* outlines, while etching with acid ferric chloride or chromic acid will immediately produce "polyhedra."

It is by no means implied that these staining effects are undesir-

able. For, no matter what the esthetic effect, every staining is caused by the specific character of the region stained. Even a stain produced due to disturbed metal is important, because it reveals the latter's presence. And, if a stain continues to reappear after many repolishings, mechanical or electrolytical, it points out definitely some local discontinuity, and should be studied thoroughly instead of being discarded for its ugliness and lack of agreement with preconceptions regarding the nature of the structure looked for.

A logical choice of the etchant: It might be too presumptuous to try and offer ideas leading to some universal etching solution. Such hardly can be found. However, it is worth while to reduce the huge number of etchants published to just a few, chosen on the basis of chemical logics, not a mere "cut and try," "hit and miss," or "lucky strike" idea. This is what the writer endeavors to do in this article.

Among all the etchants possible there is a great number that should be called "violent." In fact most of them are violent. Even an alcoholic solution of picric acid is violent and

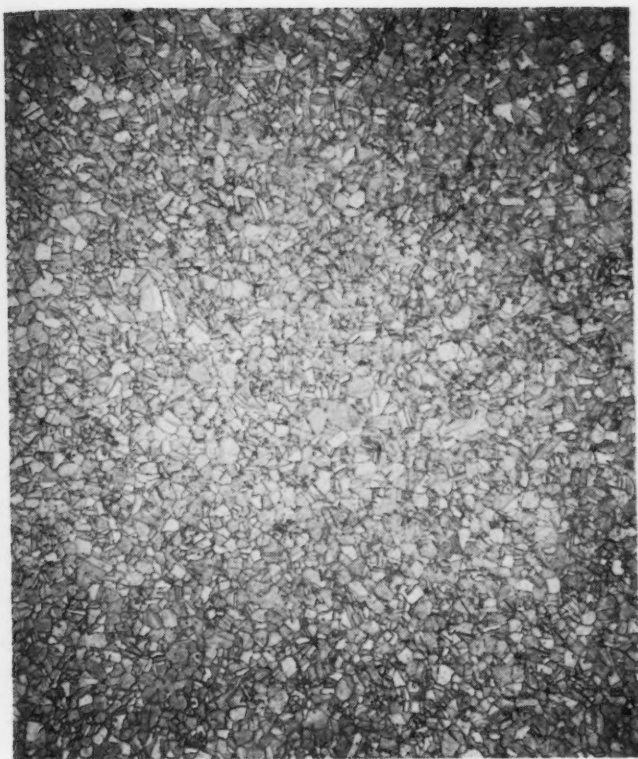


FIG. 13—Commercial rod of K-Monel, as delivered. The grains are clearly defined. At 100 diameters.



FIG. 14—Same as Fig. 13 but at 500 diameters. The grain boundaries are heavy and the grains somewhat mottled on account of the presence of undissolved hardener (probably NiAl).

will produce a black blur unless handled skillfully. A solution of hydrochloric acid will etch steel well enough if acting for a fraction of a second, otherwise it will pit the sample so badly as to call for a re-grinding on paper No. 1, etc., etc.

A non-violent etchant is one whose action is not accompanied by any development of gases. This implies a reaction of a straight transfer between the etchant and the metal. And such reactions depend exclusively upon the lowering of valency of some element present in the etching solution.

Reagents of this kind are never highly ionized, and the ionization can be even further reduced by using a proper solvent. Therefore, their action is slow and can easily be controlled. In certain cases the etching action may be allowed to go on for hours and even days, continuously revealing new structural details—not new phases, merely more delicate features of phases already known.

Ferric ion solutions: The most accessible reagents which act by changing their valency are the ferric salts of iron. There are the

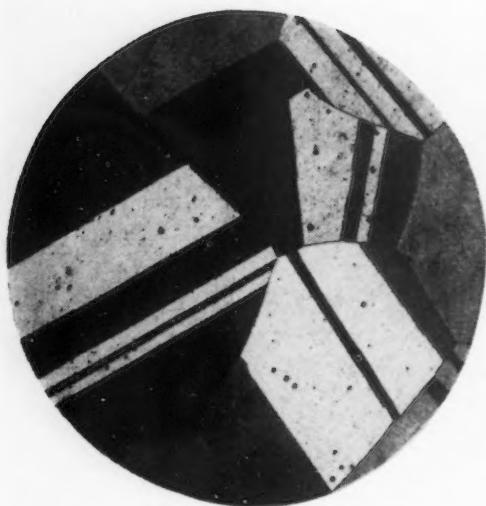
chloride, bromide, iodide and fluoride in the first line; nitrate and sulfate in the second. The first four are quite soluble in water, alcohol, glycol, glycerol, even in ether, and their action is very simple: one quite mobile ion of a halogen is taken away by the metal to be etched. The SO_4^{2-} and NO_3^- ions are much less mobile and their action is therefore much slower or even too slow. The ferric salts are capable of attacking the great majority of the existing metals, and at a proper temperature they etch even platinum.

It might be said that ferric chloride is by no means a new etchant. That is true. However, it has been used mainly for copper-base alloys. And, here the use of a straight ferric chloride solution is out of question, because an insoluble precipitate of fine crystals of cuprous chloride forms in a haphazard manner and obstructs the view. For this reason the ferric chloride reagents always carry some hydrochloric acid and this immediately puts them in the class of violent etchants, to be used skillfully and rapidly, without any chance of obtaining more information by pro-

longed etching. What the writer proposes is the use of ferric salts of any concentration but in various solvents in the complete absence of an ionized acid. And, instead of using these etchants on copper alloys it is proposed to use them only on metals which cannot form insoluble subchlorides or chlorides. This eliminates copper, silver, gold, mercury, lead, and leaves iron, nickel, cobalt, aluminum magnesium, tin, antimony. To all of the latter a properly chosen solution of some ferric salt can be applied as an etchant, although in certain cases a protecting film present on the surface of the sample must be eliminated first by etch-polishing or electro-polishing.

The etching of nickel alloys: It is well known that the etching of nickel and its alloys is considered a difficult task. Scores of reagents were offered and some seem to have given good results if skillfully used in specific cases. Here we propose to consider how nickel acts under the etching attack of ferric chloride dissolved in water.

No concentration of the reagent will be indicated. Any one can be used from that having a merely

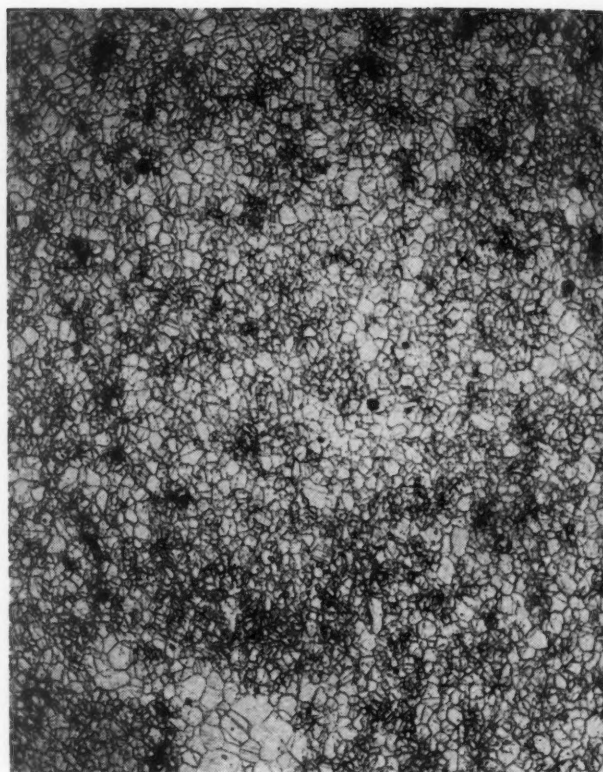


LEFT

FIG. 15 — K-Monel after an anneal at 1250 deg. C. in molten barium chloride; water quenched. At 100 diameters. Perfectly analogous to alpha brass. Grain boundaries sharp because no hardener is present and excessive chemical action is eliminated.

RIGHT

FIG. 16—Commercial rod of Z-nickel (an alloy containing small amounts of magnesium, carbon and titanium, and hardened by the precipitation of carbides, magnesium preventing the formation of graphite). Grain size quite clear. Dark areas correspond to an excessive precipitation of the hardener. At 100 diameters.



visible yellow tinge to one that carries a deep orange color. All will work even when cold, and a slight heating will expedite the process if need be. This writer prefers quite dilute cold solutions, but it is merely a personal preference.

Consider, then, cathode nickel. The sample examined had extremely high mechanical characteristics. With a tensile strength of 85,000 lb. per sq. in. and a hardness of 180 Brinell it combined a ductility of 45 per cent elongation in 2 in. and an impact resistance of over 90 ft.-lb. Izod.

Figs. 1 and 2 show the structure of this cathode at 100 and 500 diameters. The black streak is the boundary between the starting sheet and the heavier part of the cathode. Attention must be drawn to the precise duplication and continuation of the crystalline outlines across the gap.

This cathode nickel was cold rolled 50 per cent into strips; Fig. 3 shows the resulting structure at 500 diameters. The cold rolled cathode was next annealed at 800 deg. C., and Fig. 4 shows at 100 diameters the structure of the annealed metal in and outside of the starting sheet.

In another experiment the cathode was annealed at the same temperature without cold rolling. It recrystallized completely, as is

shown in Figs. 5 and 6, at 100 and 500 diameters respectively. It is also quite obvious that in spite of being separated by a wide gap of hundreds of thousands interatomic distances, the crystals in the starting sheet and their continuations recrystallized to single grains as if nothing did separate them.

The recrystallized cathode was also cold rolled 50 per cent. Fig. 7 shows the structure of the distorted metal at 100 diameters. Finally Fig. 8 shows the structure of the previous sample after it was annealed at 800 deg. C.

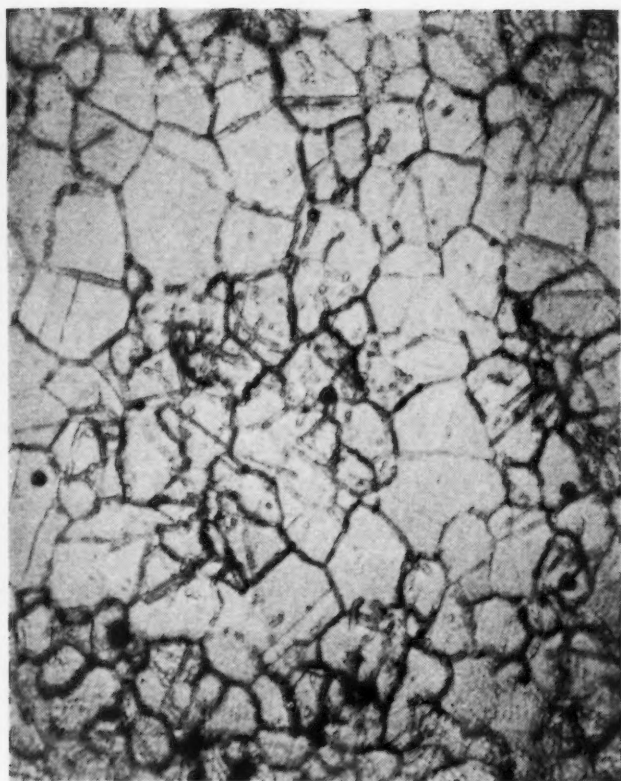
So much for the cathode nickel, which is probably as pure as it possibly could be except for the presence of cobalt and hydrogen—the latter in a form which made the metal extremely strong, quite hard, but did not embrittle it as the presence of hydrogen does usually under different conditions.

Consider next what results can be obtained with commercial nickel that was melted from cathodes, ingoted, hot rolled and cold drawn before being turned over to the customer. Fig. 9 shows at 100 diameters the structure of a rod of commercial nickel which contained carbon and was magnesium treated. It is evident that the picture allows for a good determination of the grain size. On the other hand, it contains a great number

of fine black spots in the grains and along their boundaries. However, this was not the fault of the reagent, for, examine Fig. 10 which shows the unetched structure of the same sample. It is full of the same black spots and carries two grayish inclusions besides. Some of the black spots (probably graphite or magnesium oxide or both) certainly became enlarged in etching with FeCl₃, but this cannot be avoided except by controlling the time of etching.

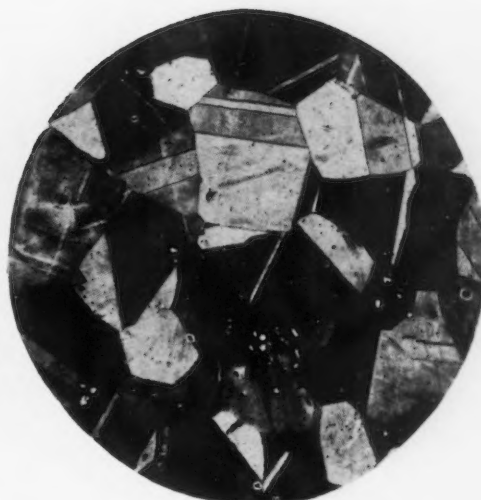
How about nickel base alloys? Figs. 11 and 12 show at 100 and 500 diameters the structure of a heat-hardenable Ni-Be alloy containing carbon and chromium. The possibility of making a reliable grain count is obvious and the presence of stringers of chromium carbide is rather distinct.

Figs. 13 and 14 show at 100 and 500 diameters respectively the structure of a commercial rod of K-Monel. The sample was slightly overetched and the grain boundaries are somewhat thick. However, this alloy, as quenched from 1050 deg. C. contains some aluminide thrown out to the grain boundaries—therefore, the excessive etch along them. Fig. 15 shows the same alloy as quenched from 1250 deg. C. The grains are obviously too large; however, all aluminide was dissolved and therefore the bound-



LEFT

FIG. 17—Same sample as in Fig. 16 but at 500 diameters. The presence of the undissolved hardener at the grain boundaries causes the latter to be quite diffuse.



ABOVE

FIG. 18—Same metal as Fig. 17 but annealed in barium chloride at 1250 deg. C. Practically all hardener dissolved or coalesced (white specks). Grain boundaries quite sharp and the structure looks like that of alpha brass. At 100 diameters.

aries are fine in spite of a 5-min. etch.

Figs. 16 and 17 show the structure of commercial Z-nickel (an alloy in which the presence of magnesium and titanium permits the hardening of the metal by carbide precipitation to 320 Brinell). It also was quenched from 1050 deg. C. while not all the carbide was yet dissolved. Some of the grain boundaries are quite distinct, showing that in those spots the hardener went fully in solution. In other spots the boundaries are heavy—due to the presence of carbides

which caused an accelerated action. Many spots are darkish due to the spontaneous precipitation of the carbides. The presence of grainlets of the latter is distinct at 500 diameters, mainly at the grain boundaries.

The same sample was also annealed in molten barium chloride at 1250 deg. C. and oil quenched. Again the grains became quite large and rather precisely defined in boundaries, as Fig. 18 shows. The latter reveal as well that the granules of carbides still remained

undissolved and in fact grew in size in comparison to the 1050 deg. C. treatment (Fig. 16).

So much for the etching of nickel and its alloys. The author believes to have furnished enough proof that neutral FeCl_3 in aqueous solutions forms a good etchant for this class of work. It must be added that the same is not true for Nichromes except in their cast state. The wrought Nichromes refuse completely to be etched by FeCl_3 except in etch-polishing, which will be discussed later.

Salvaging Porous Pressure Castings

PRESSURE castings which are unable to meet required pressure tests due to excessive porosity can be salvaged by impregnation with a newly developed phenolic resin, according to Durez Plastics & Chemicals, Inc. Citing a specific example of such salvage possibilities, the company reports on a pump casting which was required to withstand a water test of 500 lb., but which leaked at 100 lb. pressure due to porosity. After impregnation with this new material, called

Durez 7347A, the casting withstood a pressure test of 800 lb. without leakage.

Impregnation with Durez 7347A is accomplished by forcing the resin into the pores of the casting under pressure of between 45 and 100 lb. per sq. in. This may be done in either a pressure tank or by sealing the casting outlets and pumping the resin into the casting under pressure. This pressure treatment is followed by application of heat to polymerize the resin. The heat

may be applied by either baking in an oven for several hours at 250 to 275 deg. F., or in a pressure tank by applying steam at 20 lb. pressure for two hours, followed by 100 lb. pressure for another two hours.

Resin treated in this manner is described as practically impervious to water, solvents, mild alkalis and acids. The Navy Department has approved resin impregnation of castings for certain types of pump castings.

Basic Open Hearth

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THE last of this series of three articles on refractories used below the sill plate level discusses the construction, materials, causes of failure, and lines of improvements in checkers, checker chambers, gas and air valves, and flues.

The Checkers (Section 33*)

THE distinctive feature of the Siemens Martin or open hearth furnace is the regenerative system. The preheating of the gas and air before they enter the furnace enables a much higher

*Diagram illustrating nomenclature of parts marked "Sections" appeared in THE IRON AGE, May 22, 1941, p. 41.

temperature and hence a faster melting rate to be obtained, and at the same time increases the fuel efficiency of the furnace. A study of open hearth furnace checkers in a number of steelworks shows that the current practice both as regards materials and the type of setting employed, varies over a wide range. Comparatively little information is, however, available regarding the relative efficiencies of

these different arrangements. This is not surprising, since the carrying out of a heat balance on an open hearth furnace is an exceedingly difficult task, while any comparison of similar furnaces having different types of checkers is open to the objection that other variables, such as the melting program, have prejudiced the result.

(A) CONSTRUCTION:

A large number of complicated checker designs are manufactured and numerous advantages are claimed for their use, among which may be mentioned bigger surface area, maintenance of high gas velocity in the lower part of the chamber, freedom from choking

TABLE IV—The Properties of Checker Bricks

	Semi-Silica			Fireclay	Silica
	(1)	(2)	(3)		
Chemical analysis:					
SiO ₂	88.7	92.3	88.0	53.8	95.8
Al ₂ O ₃	9.1	5.8	7.9	39.2	0.8
Fe ₂ O ₃	1.0	0.5	1.2	2.7	0.9
TiO ₂	0.4	0.7	0.7	1.6	0.0
CaO	0.2	trace	0.4	0.3	1.6
MgO	0.3	0.2	trace	0.7	0.3
Alkalies	0.4	0.5	0.8	1.4	0.5
Loss on ignition, per cent. ....	...	...	0.3	0.2	0.2
Melting point, deg. F.	over 2912	over 2912	over 2912	2840	3074
Cold crushing strength, lb. per sq. in.	1480	over 8030	1250	2350	4680
Porosity, per cent.	23.6	23.3	27.7	26.3	26.8
Bulk density, gm. per cc.	1.93	1.90	1.85	1.96	1.70
Thermal conductivity (hot face, 1292 deg. F.)					
B.t.u.	5.6	7.1	5.6	6.2	7.5
C.g.s. units	0.0019	0.0024	0.0019	0.0021	0.0026
Specific heat, c.g.s. units (from 1382 deg. F.)	0.26	0.245	0.27	0.25	0.255
Heat capacity = specific heat × bulk density	0.50	0.47	0.50	0.49	0.43
Average		0.49		0.49	0.43
Diffusivity factor = $\frac{\text{thermal conductivity}}{\text{bulk density} \times \text{sp. heat}}$	3.8	5.1	3.8	4.3	6.0
Average		4.2		4.3	6.0

and greater rigidity. Whichever type is employed the result is bound to be a compromise between the weight of checker filling per unit volume and the heating surface exposed to the gases. Thus, the following figures show typical comparative data for a special shape similar in design to the Moll checker and settings made from standard squares. It will be seen that the special shape offers a much greater vertical heating surface, but it is impossible to say with any certainty whether this is more than compensated for by the lower weight of brickwork per cubic yard. It is true that formulas exist for the calculation of checker efficiencies, but the number of assumptions and approximations made may well lead to errors of a greater order than the actual differences between the efficiencies of the types considered.

Types of Checker Settings

Type	Flue Area	Weight† of Checker Brick Per Cu. Yd.	Vertical Heating Surface Around the Free Area, Per Cu. Yd.
9x4 1/2 x 2 1/2 in.	4 in. sq.	1460	81
9x4 1/2 x 3 in.	3 in. sq.	1592	54
Special shape, 1 in. thickness..	Complex	1440	111

†Assuming a bulk density of 118 lb. per cu. ft.

Thus a checker may have a high efficiency if the air circulates through it in the ideal manner, but in actual practice may contain a serious amount of "dead" space. If one set of checker chambers was filled with standard squares, and the other with special shapes, any difference in efficiency would be apparent, but the experiment might prove an expensive one if the furnace worked out of balance. Valuable data might be obtained using small scale checkers in a baby open hearth furnace of the type available in certain American laboratories, though here again difficulty would be experienced in simulating the slagging and choking of the checkers experienced in large scale practice.

(B) MATERIALS:

(1) *Fireclay and Semi-Silica Brick*: Most open hearth furnaces in Great Britain employ either medium alumina or semi-silica (sand-clay) brick for the checker work, with the exception of the top five to ten courses, which are usually of silica or high alumina fire-clay brick*. The results of a num-

*High Al₂O₃ in Britain generally means 42 per cent.

ber of tests on semi-silica and fire-clay brick similar to those now used in checkers are summarized in Table IV.

The fireclay material examined was in the form of a special shape while the semi-silica brick were standard squares (9 x 4 1/2 x 2 1/2 in.).

Porosity and Bulk Density: In view of the fact that the object of the checker work is to recover heat from the outgoing gases, the heat capacity which is a direct function of bulk density is clearly important. Checker bricks have been tested with porosities as low as 13.0 per cent and bulk densities as high as 2.27 gm. per cc., but in general the porosity of a checker brick lies between 20 and 25 per cent. According to Keller, however,

the thermal conductivity, which is a function of porosity, has surprisingly little influence on the efficiency of the checker.

Specific Heat: Refractory materials appear to vary less in their specific heats than in almost any other property, the value obtained for checker bricks being monotonously close to 0.25.

Thermal Conductivity: The conductivity of each of the test brick was determined over a range of temperatures using an apparatus similar to that supplied by T. H. Blakeley and J. W. Cobb (J. Soc. Chem. Ind., 1932, 51, 83T). It will be seen that the thermal conductivity of the fireclay brick tested, like the specific heat, falls within the range of values given by the semi-silica brick.

Heat Capacity and Diffusivity: The heat capacity of a checker brick, assuming it to have attained a uniform temperature throughout, is simply a function of the bulk density and the specific heat. It will be seen from the table that the product of these terms when calculated for the range 1380 deg. F. to room temperature is close to 0.50 for both the fireclay and semi-silica brick. The rate at which the heat diffuses into the brick will depend both on the thermal conductivity and on the heat capacity. The diffusivity factor (= thermal conductivity ÷ bulk density × specific heat) will be seen to be much the same for both types of brick.

The above comparisons involve a number of assumptions and are

TABLE V—Used Versus Unused Checker Bricks

Chemical analysis:	Unused Brick	Used Gas Brick		Used Air Brick	
		Skin	Inside	Skin	Inside
SiO ₂	56.9	53.4	...	55.7	...
Al ₂ O ₃	33.7	33.4	...	34.0	...
Fe ₂ O ₃	5.8	5.1	...	5.8	...
TiO ₂	0.9	1.1	...	1.1	...
CaO	0.1	0.3	...	0.2	...
MgO	0.9	0.5	...	0.6	...
Alkalies	1.4	5.3	...	1.4	...
ZnO .....	...	0.8	...	0.8	...
MnO .....	...	0.1	...	0.05	...
Loss on ignition, per cent.	0.2	...	...	...	...
Melting point, deg. F.	2840	2300	2822	2300	2642
Cold crushing strength, lb. per sq. in.	2350	3310		4960	
Porosity, per cent.	26.3	21.7	26.4	21.3	27.0
Bulk density, gm. per cc.	1.96	2.04	1.92	2.09	1.93
Average		1.98		2.01	
Thermal conductivity (hot face, 1292 deg. F.)					
B.t.u.	6.2	6.2		6.6	
C.g.s. units	0.0021	0.0021		0.0022	
Specific heat (from 1382 deg. F.) c.g.s. units..	0.25	0.25	0.25	0.25	0.25
Heat capacity	0.49	0.495		0.50	
Diffusivity factor	4.3	4.2		4.6	
Permeability to air (through both skins), c.g.s. units	0.0052	0.0071		0.0028	

based on the examination of a limited number of samples. They represent an over simplification of checker conditions, but at least serve to show that there is little difference between typical fireclay and semi-silica brick as regards heat capacity or the rate at which heat is absorbed.

Other Properties: The melting points of the bricks are not particularly high, but there is little likelihood of fusion occurring, since the maximum checker temperature rarely exceeds 2462 deg. F.

(2) SILICA BRICKS:

The high temperature and the corrosive dust found at the top of the checkers necessitate the use of silica or high alumina fireclay brick. In some plants silica bricks are used throughout. The results

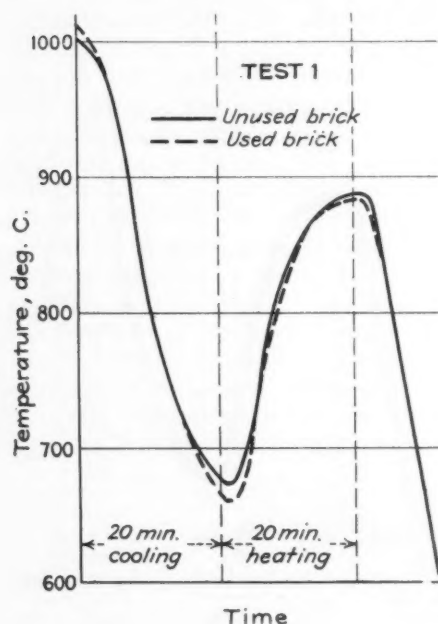


FIG. 8—Heat penetration tests on used and unused air checker brick.

given in Table IV suggest that for this silica brick, which has an unusually low bulk density, the heat capacity would be less than for that of the fireclay or semi-silica brick, but this would be compensated at least to some extent by higher diffusivity.

(3) HIGH ALUMINA FIRECLAY BRICKS:

Both in the United States and in Great Britain fireclay brick of 40

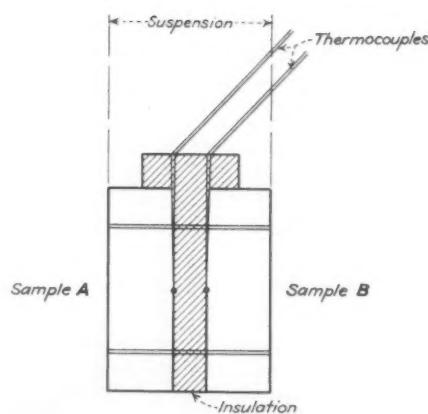


FIG. 7—Apparatus used for the comparison of heat penetration in checker brick.

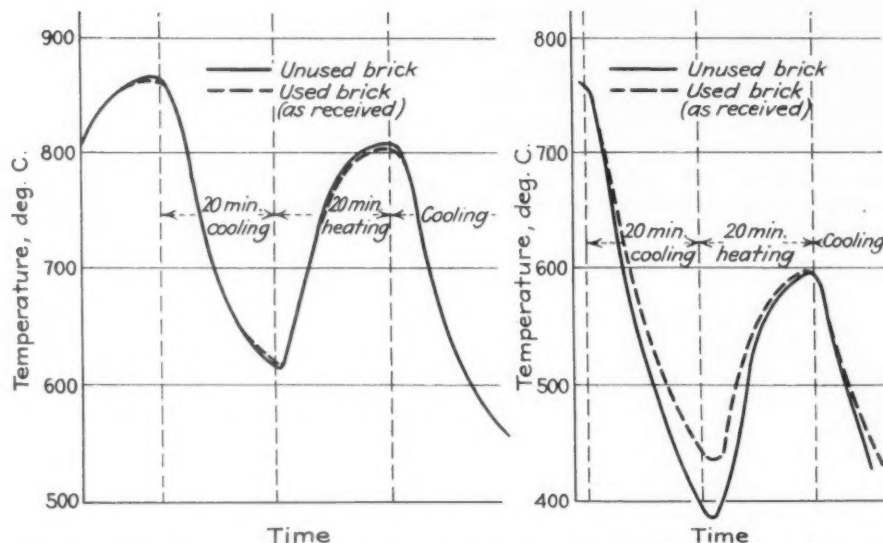
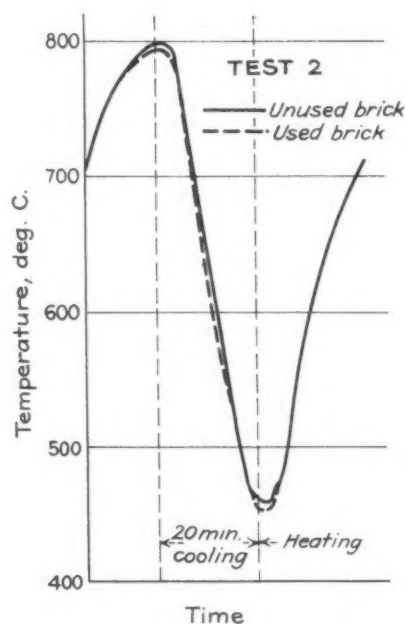


FIG. 9—Heat penetration tests on used and unused gas checker brick, both as received (left) and glazed by refiring (right).

per cent alumina and over have been successfully employed in the top section of the checkers. Such brick is now available of high bulk density, good volume stability and unusually high refractoriness under load, while their slag resistance is definitely superior to that of the low alumina quality.

(C) LIFE AND CAUSES OF FAILURE:

Checker brick, particularly at the top of the setting, is subject to severe corrosion by basic dust consisting mainly of iron oxide and lime, but containing also considerable quantities of such materials as lead, zinc and alkalis. In general, the top section is quite unfit for use after a campaign of say 26 weeks, but brick lower in the setting where the temperature is not so great, although coated with dust is not severely slagged. In some steel plants most of the used checker brick are thrown away, whilst in others a large proportion of the brick is cleaned and re-used. In one works it was the practice to re-use the air checker brick, which is similar in color to the unused brick, but to throw away the red-colored gas checker brick, which was alleged to be weak, likely to crack on heating, and "natureless," that is, unable to absorb and give out the required amount of heat. A study was made of such brick with a view to finding whether this procedure was justified.

Samples chipped from the skins of the used bricks gave analyses similar to those of the unused brick (See Table V), the only marked change being an increase in the alkali content of the gas checker

brick. The red color of the latter does not, as is usually assumed, imply a high iron content, but merely a different state of oxidation. This is borne out by the fact that such a brick on reheating in an oxidizing atmosphere assumes a similar color to that of the unused material.

Melting Point: The determination of the melting point and chem-

brittle than the unused product, but had an even higher cold crushing strength. The permeability even of the slagged surface was of the same order as that of the original brick.

Specific Heat and Thermal Con-

of insulating material and two thermocouples used to determine the rate at which heat penetrated through the test samples when the whole set up was lowered into a furnace at 1652 deg. F. Heating of the couples by convection was min-

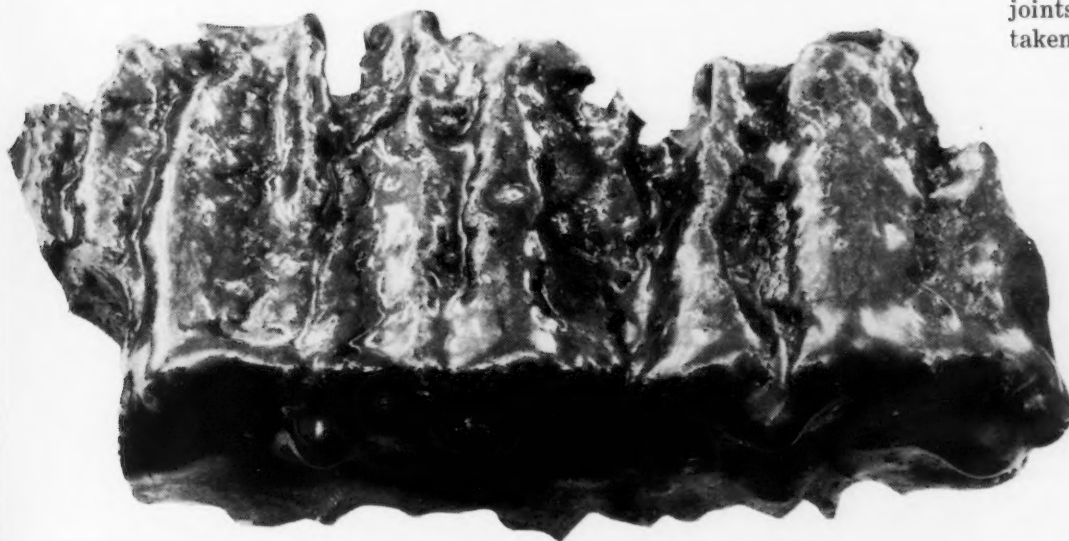
RIGHT

FIG. 10—Silica brick removed from the air checker shown in Fig. 14.

o o o

BELOW

FIG. 11—Semi-silica brick removed from the lowest course visible in Fig. 14.



ical analysis of the skin of a checker brick is complicated by the fact that the amount of impurity decreases with the depth of penetration. In the present tests the cone cut from the gas checker brick ($\frac{1}{8}$ -in. thick skin) melted suddenly at 2300 deg. F., while that from the air checker brick although fused and bloated on the slagged face remained erect even at 2462 deg. F., indicating a small depth of slag penetration.

Cold Crushing Strength and Permeability: The bricks examined were more vitrified and hence more

ductivity: Both the thermal conductivity and the specific heat of the used bricks were very similar to that of the unused bricks.

Heat Capacity and Diffusivity: Heat capacity calculations indicate that the used bricks are capable of storing more heat than the unused brick, while the diffusivity factor has an intermediate value. The absence of any big change in diffusivity was confirmed by a direct experiment using the arrangement shown diagrammatically in Fig. 7. The two slabs which were of similar size, were separated by a layer

imized by wiring the various pieces together and cementing all the joints. Temperature readings were taken on alternate couples at half-minute intervals. A test made on two test pieces cut from the same brick showed negligible divergence between the two time temperature curves, while a test using magnesite on the one side and fireclay on the other showed a considerable divergence due to the higher diffusivity of the magnesite brick. Fig. 8 shows the results obtained in two consecutive tests on unused and used air checker brick, while Fig. 9 shows the result for the gas

checker brick. In neither case was any appreciable divergence noted. If, however, the gas checker brick was first glazed by heating it to 2282 deg. F. the rate at which the corresponding thermocouple rose and fell was markedly decreased. This difference was presumably due to the reflection of heat from the glazed surface and confirms the current opinion that glazed brick are not suitable for re-use in checkers. The above experiment takes little account of heat transferred by convection, but since clean unglazed brick has a similar surface



FIG. 12—New air checker setting viewed through the wicket.

to unused brick, the general conclusion probably holds.

Works Trial: Following the above experiments a trial was made in which both the gas and air checker brick were re-used and no loss of efficiency was noted. The use of all clean unglazed checker brick both from the gas and air chamber has, therefore, been adopted with considerable savings.

Action of Furnace Dusts on Checker Brick: The extent to which checker bricks, particularly in the top of the setting, are destroyed by dust brought over with the waste gases is clearly shown in Figs. 10 and 11. Fig. 12 shows a new setting for a 60-ton basic open hearth furnace viewed through the wicket of the air checker chamber, while Fig. 13 shows the same setting viewed over the bridge wall. The top three courses remaining in the setting shown in Fig. 14 were silica bricks at the beginning of the campaign. As a result of prolonged heating at temperatures as high as 2462 deg. F. they have been transformed to a mixture of large lath-shaped tridymite crystals and glass. A thermal expansion curve showed no sign of the cristobalite change so prominent in unused silica brick. The general texture of the silica bricks in this part of the setting is very similar to that of the second zone (black) found in an open hearth furnace roof brick behind the grey tridymite face. Since cristobalite is only stable above 2678 deg. F., it is not surprising that it has been replaced by coarsely crystalline tridymite in the top silica bricks.

The silica bricks are saturated throughout by fluxes but the semi-silica bricks as shown in Fig. 11 are

only attacked on the surface. The reaction product between the dust impacting on the top of these bricks and the semi-silica material yields a slag which runs down the vertical surfaces dissolving silica on its way and forming deep grooves.

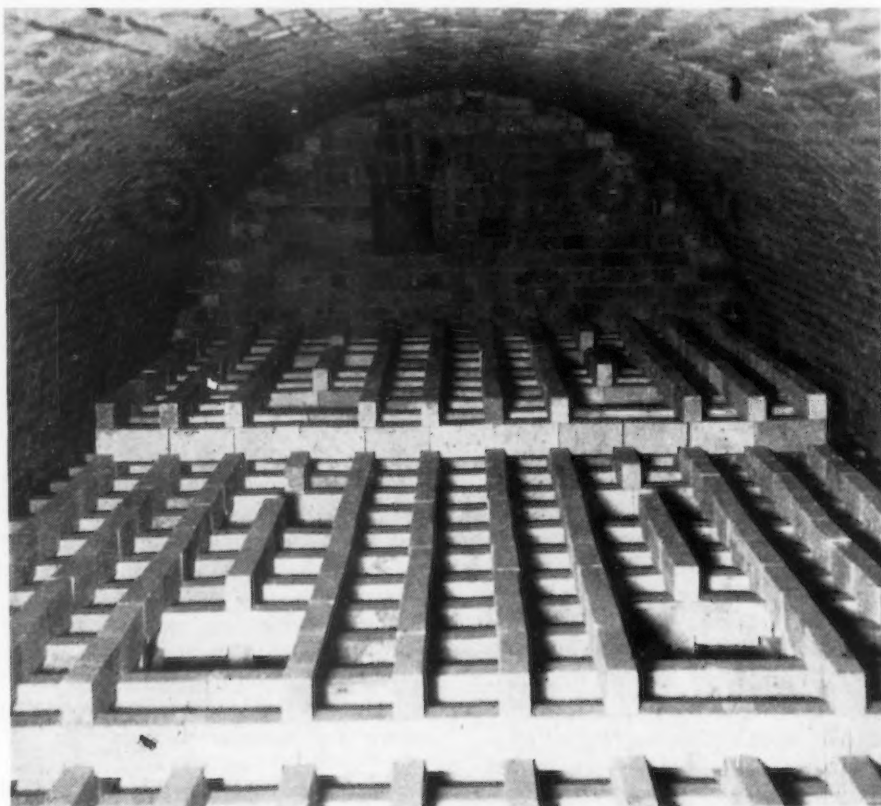
The chemical analysis of the skin of a glazed semi-silica brick after use in the gas checker of an open hearth furnace is shown in Table VI together with an analysis of the unused brick. The attack on this brick appears to have been almost solely due to iron oxide, though

some slight increase in the alkali content has also occurred.

The chemical composition of checker dust varies greatly from one furnace to another according to the type of material being melted and the design and condition of the slag pockets. Columns three and four in Table VI show the result of averaging seven air checker dust analyses and six gas checked dust analyses, all relating to basic open hearth furnaces. The only oxides which are present in consistently high amounts are iron oxide (about 45 per cent) and lime (about 10 per cent). The iron oxide is reported as Fe_2O_3 but is probably present in the reduced condition at the working temperature at least in the gas checker. Individual analyses show surprising variations in the nature and amount of other oxides present. Samples have been found containing as much as 24 per cent of zinc oxide and others with 11 per cent of alkalis or 25 per cent of sulphates.

It is unlikely that the same refractories will deal equally well with all types of checker dust and indeed in recently published work it has been suggested that where the zinc oxide content of the dust is high, the use of high alumina fireclay

Fig. 13—New air checker setting viewed over the bridge wall.



brick rather than silica brick in the top part of the setting is desirable.

This conclusion which was reached by determining the melting point diagrams of ternary mixtures of silica brick, "synthetic checker dust," and zinc oxide and of china clay, "synthetic checked dust" and zinc oxide has been strikingly confirmed by works trials.

(D) LINES OF IMPROVEMENT:

(1) "Custom built" checkers to suit the individual furnace under consideration. This is largely a question of trial and error and may even involve different types of checkering for the top and bottom of the setting.

(2) The use of secondary regeneration or recuperation following the main checkers, namely, the use of cast iron blocks.

(3) De-airing of checker bricks to give higher bulk density and hence greater heat capacity and slag resistance.

The Checker Chamber

Sections 27-32 and 34-37

No attempt will be made to deal individually with the various parts of the checker chamber and its auxiliaries. It suffices to state that the working conditions to which these parts are exposed are essentially similar to those experienced at different levels in the checker setting itself and that the usual precautions regarding such things as expansion allowance, must be taken.

(A) CONSTRUCTION:

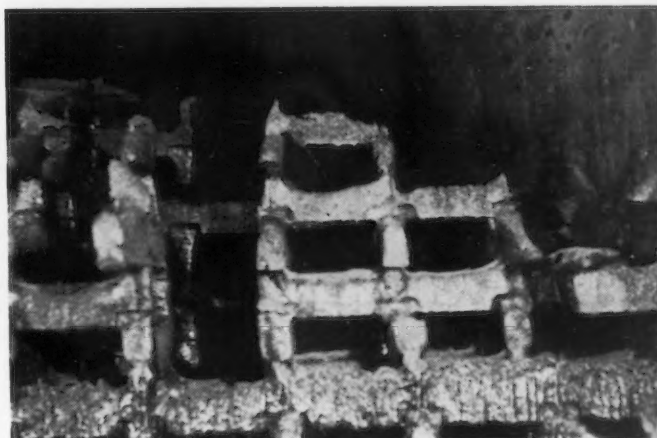
In general the checker side walls are of composite construction consisting of insulation or red brick on the outside and fireclay or silica brick on the inside. Where insulation is used the interface temperatures at the different levels must be calculated to be sure that the insulation is not over heated. In the more recent constructions, the chamber is generally encased in steel plates and the gas and air checkers are separated by a narrow channel to obviate any risk of mixing occurring. Some degree of insulation is in general used on the checker chamber arches.

(B) MATERIALS:

For the top section of the checker chamber side walls and for the checker arches either silica or high alumina* fireclay brick is em-

* 42 per cent is high Al_2O_3 in Britain.

FIG. 14—Air checker setting after 29 weeks' operation.



ployed. The silica brick is often of second quality only and is frequently soft fired. If fireclay bricks are employed in this region it is essential that they be free from serious after-shrinkage or softening at the working temperature since otherwise the life of the walls and arches may be dangerously short. In the lower sections of the checker, medium alumina fireclay bricks such as are employed in the checker setting may be used. In the top section of the checkers high temperature insulation (70 per cent porosity) fireclay brick having a maximum safe temperature of 2552 deg. F. is employed but in the bottom two-thirds diatomite brick has proved adequate. The wickets, which are knocked out periodically for examination and/or renewal of the checkers, generally consist of a 9-in. thickness of fireclay brick backed by either brick or plastic insulation.

(C) LIFE AND CAUSES OF FAILURE:

The life of the various parts of the checker chamber is generally a long one, particularly as false walls are sometimes installed to take the brunt of the attack. The conditions are essentially similar to those experienced by the checker bricks themselves at the corresponding level. The wear on the walls is most severe opposite the top of the checkers.

(D) LINES OF IMPROVEMENT:

(1) Insulation of the checker chambers (if not already carried out) preferably as part of a scheme of complete insulation above and below the stage level.

(2) Independent steel plating of the gas and air chambers to reduce air infiltration and the risk of mixing of the gas and air.

Gas, Air Valves and Flues

Sections 38, 39 and 40

(A) CONSTRUCTION:

The construction of reversing valves is hardly a refractory problem, and those who wish to study the subject are referred to Buell's book on "The Open Hearth Furnace." Suffice it to say that big differences exist in the performance of the different types particularly as regards the pressure drop through the valve.

(B) MATERIALS:

Both valves and flues are lined with second quality fireclay brick.

(C) LIFE AND CAUSES OF FAILURE:

Flues have an extremely long life—10 to 20 years—since they operate at temperatures well below those at which serious reaction with the furnace dust occurs. The absence of trouble is not due to the lack of corrosive slags as the following analyses of material removed from the base of a damper in an air flue of a basic furnace will show:

	Dense Slag, Per Cent	Porous Slag, Per Cent
SiO_2	45.3	42.8
FeO	13.6	15.2
Al_2O_3	21.7	22.0
MnO	0.7	1.6
CaO	2.8	2.4
MgO	1.4	1.4
SO_3	0.1	0.2
P_2O_5	0.4	0.5
Alkalies	4.4	4.0
CuO	0.1	0.1
SnO_2	0.2	0.1
PbO	6.7	6.4
ZnO	2.9	3.3

Trouble might be expected because of the action of reducing gases on the iron spots in the low grade fireclay bricks used for lin-

ing the flues, but no such trouble has in fact come within our experience. Leakage from water-sealed valves at water-cooled dampers may, however, lead to "rotting" of the brickwork.

In the present article and in the one preceding it an attempt has been made to outline the problems arising in the construction and maintenance of basic open hearth furnaces as they affect the user and manufacturer of refractory materials. Comparatively little has been said regarding the fundamental properties of the materials concerned since it is hoped to deal with these in subsequent articles on raw materials.

Even if the furnace refractories prove adequate for the severe duty placed on them, the steel has still to meet with a number of refractory problems before it reaches the ingot stage. It may pick up dirt from the ladle, break-away through a faulty nozzle or hit on a multitude of other snags in its passage through a bottom-pouring set-up. The variety of refractories used in the casting pit will be discussed in the next article and tentative specifications will be suggested for a number of the refractories employed.

Acknowledgment

In conclusion the author would like once more to express thanks to Dr. T. Swinden, director of research, United Steel Companies, Ltd., for permission to publish this review, Percival Smith and Mr. McKendrick for permission to use Figs. 1 to 6, the British Ceramic Society for the illustrations Figs. 7 to 14, and colleagues in the steel and refractories industries for their constant assistance.

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Table VI—Analyses of Checker Bricks and Dusts

Col. No. Material	(1) Glazed Surface of Semi-Silica Brick	(2) Unused Semi- Silica Brick	(3) Checker Dusts	
			Air	Gas
Fe ₂ O ₃	29.4	1.1	48.3	39.3
FeO	21.6	...	0.0	0.2
CaO	trace	trace	7.9	13.6
MgO	trace	0.2	2.6	4.1
MnO	trace	0.05	1.8	1.2
SiO ₂	39.9	89.6	4.0	17.9
Al ₂ O ₃	5.9	7.7	3.0	9.9
SO ₃ .....	...	...	17.3	6.1
P ₂ O ₅ .....	...	...	2.6	1.9
ZnO .....	...	...	2.5	0.8
Alkalies	1.8	0.6	6.3	1.7
Miscellaneous	0.3	0.5	3.7	3.3

Selection of Cutting Oils for Threading Operations

The data published in the accompanying chart presents in convenient form the recommendations of 18 oil companies as to the particularly proprietary brand of oil to use in threading operations on various materials. The data was compiled by the Eastern Screw Machine Corp., New Haven, Conn., manufacturer of H&G dieheads.

COMPANY	Carbon Steel 1010-1095	Free Cutting 1112-X1340	Man-ganese 1130-1350	Nickel 2015-2515	Nickel Chro- 3115-3450	Molyb- 4130-4820	Chro- 5120-5150	Chrome Vanadium 6115-6195	Tungsten 7130-7260	Silicon Man- 9255-9280	Stainless Steel 14-18-8	Alumi- 50%	Brass	Bronze	Copper	Nickel	Monel	Cast Iron	Malleable Iron	Hard Rubber Bakelite Plastics
F. E. Anderson Oil Co.	Winsor 6150	Winsor 6150	Winsor 6150	Winsor 3140	Winsor 3140	Winsor 3140	Winsor 3140	Winsor 3140	Winsor 3140	Winsor 3140	Winsor 100-A	Winsor Dural	Winsor No. 5	10 Parts Water Carbisol	10 Parts Water Carbisol	Winsor 3140	Winsor 3140	4 Parts Kerosene 3140	25 Parts Water AL-71	
Atlantic Refining Co.	No. 31	No. 23 No. 31	No. 31	No. 31	No. 31	No. 31	No. 31	No. 31	No. 42	No. 42	No. 42	50% Kerosene Chippewa	No. 23 No. 31	No. 23 No. 31	No. 23	No. 42	No. 42	20 Parts Water Soluble	20 Parts Water Soluble	60 Parts Water Soluble
Cities Service Oil Co.	C. S. Grade B	I.C. S. Grade B	C. S. Grade B	C. S. Grade B	C. S. Grade A	C. S. Grade A	C. S. Grade A	C. S. Grade A	C. S. Grade A	C. S. Grade A	C. S. Grade A	No. 1 Chillo	20-30 Water Soluble Oil	20-30 Water Soluble Oil	20-30 Water Soluble Oil	C. S. Grade A	C. S. Grade A			
Eso Marketers	Dortan M-42 Pennex L-45	Dortan M-41 Pennex L-40	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-43	Dortan M-43 Pennex M-47	Dortan M-43 Pennex M-47	Fannox No. 32	Fannox No. 40	Fannox No. 44	Fannox No. 44	Dortan M-43 Pennex M-47	Dortan M-43 Pennex M-47	Fannox No. 32	15 Parts Water Kutwell 40	50 Parts Water Kutwell 40
Gulf Oil Corp.	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Electro C	Cutting Oil C	Cutting Oil C	Cutting Oil C	Cutting Oil C	Cutting Oil C	Cutting Oil C	Cutmax 1050	8 Parts Water Permiso No. 60	Solcut 30-Water 1-Kero-sene
E. F. Houghton & Co.	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	Cutmax 1050	10 Parts Water Solcut	Spec. 152	20 Parts Paraffin Cutmax B-4	20 Parts Paraffin Cutmax B-4	Cutmax 1050	Cutmax 1050	25 Parts Water 270	50 Parts Water 138	30 Parts Water 134
International Chemical	184	184	183	183	183	183	183	183	183	183	Quaker Kut 40-A-10	A.M. Base A.M. Base No. 2	Pella 29R	Pella 29R	Pella 29R	Umbra	Umbra	Solvac 100 M Spec.		
Quaker Chem. Prod. Co.	Quaker Kut 45-A-10	Quaker Kut 45-A-10	Quaker Kut 45-A-8	Quaker Kut 40-A-8	Quaker Kut 40-A-5	Quaker Kut 40-A-5	Quaker Kut 40-A-5	Quaker Kut 40-A-5	Quaker Kut 40-A-5	Quaker Kut 40-A-5	Quaker Kut 140	Pella 28K	60% Kerosene EFG	Vacmul 3D	Vacmul 3D	Vacmul 9E	Quaker Kut 40-A-8	Quaker Kut 40-A-8	Quaker Kut 56-Water	
Shell Union Oil Co.	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Lata 28K	Umbra	Umbra	Umbra	Umbra	Umbra	Umbra			
Sinclair Refining Co.	EFG	EFG	EFG	EFG	EFG	EFG	EFG	EFG	EFG	EFG	Sultran 18D	Sultran 18D	Sultran 18D	Sultran 18D	Sultran 18D	Sultran 18D	Sultran 18D	Sultran 18D		
Standard Oil of N. Y.	S-105	S-105	S-105	S-110	S-110	S-110	S-110	S-110	S-110	S-110	S-110	9810	9805	9805	9805	S-110	S-110			
Sulfo, Inc.	Tec Cut No. 15	Tec Cut No. 10	Tec Cut No. 15	Tec Cut No. 10	Tec Cut No. 14	Tec Cut No. 14	Tec Cut No. 14	Tec Cut No. 15	Tec Cut No. 15	Tec Cut No. 15	Tec Cut No. 15	Alcut	Tec Cut No. 14	Tec Cut No. 14	Tec Cut No. 14	Tec Cut No. 15	Tec Cut No. 15			
Sun Oil Co.	S-105	S-105	S-105	S-110	S-110	S-110	S-110	S-110	S-110	S-110	S-110	9810	9805	9805	9805	S-110	S-110			
D. A. Stuart Oil Co.	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut	Thred Kut No. 98	90% Kerosene Superior Kool	20 Parts Paraffin Thred Kut	10 Parts Paraffin Thred Kut	Thred Kut	Thred Kut No. 99	Thred Kut No. 99	75% Kerosene Thred Kut	50 Parts Water Solvol	
Swan-Finch Oil Co.	503	503	525N	525N	525N	525N	525N	525N	525N	525N	525N	560	549 555	549 555	556 549	525N	557 525N	15 Parts Water Transrex	10 Parts Water Transrex	
Texas Oil Co.	A-2 Sultex	A-2 Sultex	A-2 Sultex	A Sultex	B Sultex	B Sultex	B Sultex	B Sultex	B Sultex	B Sultex	B Sultex	No. 3 Cutting Oil	522	522	No. 3 Cutting Oil	B Sultex	B Sultex	20 Parts Water 665		
Tide Water Oil Co.	651	651	651	651	652	652	652	652	652	652	652	1 Part Kerosene 655	650	651	652	652	652	20 Parts Water 665		
W. A. Wood Co.	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	D Eblis	Transo Argol Mixing Oil	Paraffin + Victor	Paraffin + Victor	Paraffin + Victor	D Eblis	D Eblis Heavy Victor			Medium High Speed Boring Oil

New Equipment

Motors and Controllers

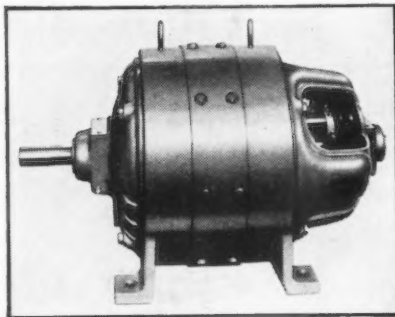
Recent innovations in the line of electric motors, circuit breakers, controls, transformers, switches, rheostats and industrial lighting are here described.

FRACTIONAL horsepower motor, built totally enclosed to meet the requirements of machine tools and other industrial applications with frequent start-stop service, plugging, and metal dust atmospheres has been introduced by the *General Electric Co.*, Schenectady. It is available in $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{3}{4}$ -hp. sizes for operation on three-phase and d.c. systems. Designed to withstand vibrations, it has a sturdy cast iron base, closely machined endshield and stator rabbets. It is equipped with tough Formex wire, a one-piece cast aluminum rotor and firmly anchored windings designed to stand up to the stresses of starts and stops as well as plugging and momentary overloads. Formex, a new heat and solvent resisting magnet wire, is used for the windings which are wedged in the stator slots and firmly anchored. To carry the thrust loads encountered in machine tool applications, ball-bearing assemblies are used in the new motors permitting the mounting of the motors with the shaft at any angle to the horizontal.



Regulator, Exciter in One Unit

EFFICIENT, quick response regulation for automatically holding constant output on d.c. and a.c. machines is available with the new Regulex in which exciter and regulator are combined in one unit. This motor was designed by *Allis-Chalmers Mfg. Co.*, Milwaukee. The Regulex consists of a differential amplifier for controlling the excitation on d.c. motors and generators to give constant voltage, current, speed or tension. This unit was originally developed for steel mills, for giving constant tension on winding and unwinding coils. It is now being applied to other drives

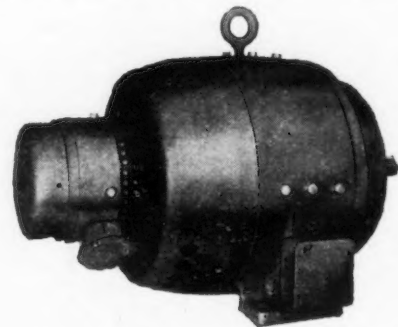


and hoists. The exciters are being produced for all sizes of d.c. machines, and they apply to a.c. synchronous motors, generators and condensers.

A.C. Generator

SINGLE phase a.c. generator of 110/220 volt, 10-kva. rating has been brought out by the *Kato Engineering Co.*, Mankato, Minn. This four-pole generator operates at 1800 r.p.m. and voltage and regulation between no load and full load amounts to about 8 per cent with a

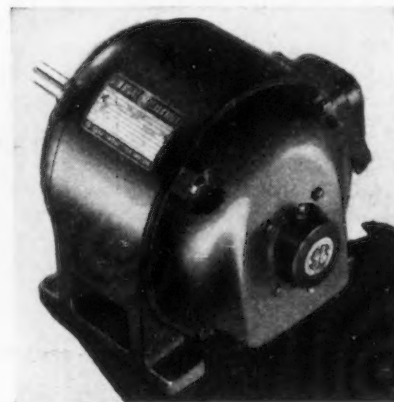
3 per cent speed change. Overload capacity is 25 per cent, with negligible temperature rise. The alternator field coils are excited from a small generator mounted on an



outer end bell. Armature shaft has a $3\frac{3}{4}$ -in. extension, the distance to the center is 9 in. and it is carried on two cartridge-type double sealed ball bearings. Brushes are easily accessible. Other sizes are available and may be furnished with or without exciter.

Tri-Clad Capacitor, Splashproof Motors

EXTENDING its recently announced line of new polyphase induction motors, *General Electric*



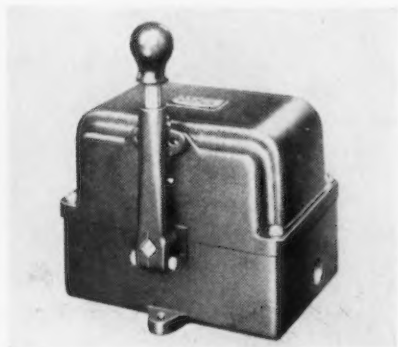
now offers new Tri-Clad capacitor and splashproof motors. The capacitor unit may be obtained with either ball or sleeve bearing construction and is available in two types, KC for moderate torque and KCJ for high starting torque. The capacitors are mounted inside the end shield on the normal torque motor, and on top of the frame in the high torque type. A centrifugal type of transfer switch is fitted and a pressed-steel conduit box provides unusually large working space. The box may be mounted in any one of four positions.

The Tri-Clad splashproof, polyphase induction motors range in sizes from 1 to 15 hp. They are especially designed to meet the needs of all applications where splashing water and other liquids are present. Frame and endshield resist corrosion and cast baffles at the side of the stator frame block splashes from the side.

Both lines of motors incorporate the protective features of the Tri-Clad line: complete mechanical protection against foreign materials and rough handling through the use of an improved cast iron frame, electrical protection by the use of Formex wires in the magnet coil, and improved bearing design and lubricating arrangements. They also utilize cast aluminum rotors.

Cam-Operated Master Controllers

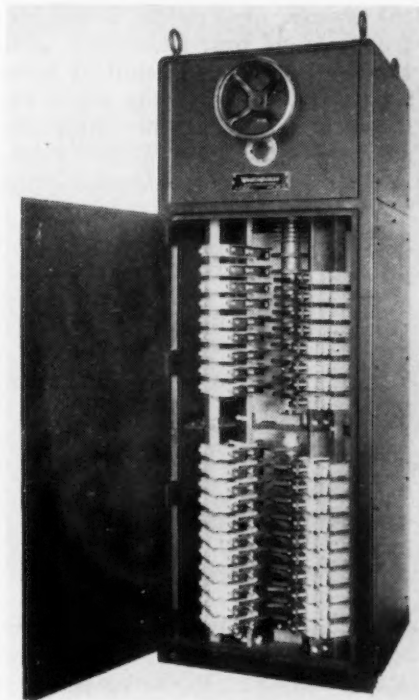
IMPROVED production through reduced operator fatigue is claimed for the new cam operated, mill duty controllers of *Cutler-Hammer, Inc.*, Milwaukee. Extreme ease of operation with positive feel of all speed positions is obtained through an adjustable compression type of star wheel spring. The controllers are available in two, three or five speeds, with or without spring return and off-position latch. Contacts are vertically arranged, and are of double break, silver to silver. Cam shaft operates on ball



bearings sealed against dust. Easily accessible terminal board simplifies installation and service. A heavy cast case and cover provide protection from dust and mechanical injury.

Motorized Secondary Controllers

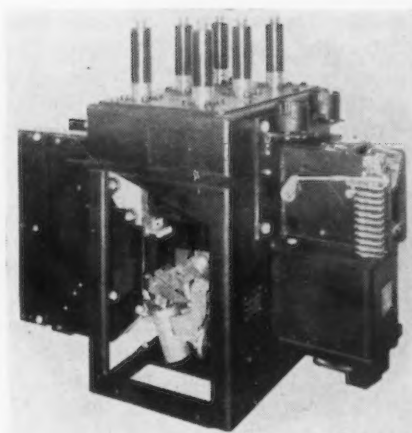
FOR use with polyphase wound-rotor motors on fan, pump, and similar drives, a new motor operated secondary controller is announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. This SC controller provides either 13 or 20 balanced points of control by varying the external resistance in



the motor secondary winding. Enclosed in a steel cabinet, the unit has cam-actuated contactors arranged for sequential operation in pairs. Individual cams give quick-make and quick-break contact action on silver-inlaid contact surfaces. There are also separate copper arcing contacts. Drive consists of a pilot motor, a gear reduction unit, and a Geneva gear for angular movement of the cam shaft. Auxiliary switches give over-travel protection. The motor may be supplied for 115 or 230 volts d.c. and 110, 220 or 440 volts a.c.

Heavy Circuit Breaker

MAGNE-BLAST circuit breaker for severe service in the heavy industries has been brought out by *General Electric Co.*, designated as type AM-10-25. It is rated



250,000 kva. for services from 4200 to 7500 volts. The solenoid mechanism is mounted on the front of the breaker and isolated from it by a heavy steel panel. Higher insulation and service voltage ratings have been obtained by careful coordination of insulation in the arc chute, increased phase spacings, and a separate box barrier for each phase. The arc is driven into an interleaving arc chute by means of magnetic blow-out coils and to assist the rapid interruption of low currents, an air booster or dashpot is included in the contact structure. As the contacts part under low current conditions, the air from the booster forces the arc deep into the chute where it is promptly extinguished.

Industrial Multi-Breakers

ILLUSTRATED is one of the type M1 and M2 industrial multi-breakers announced by *Colt's Patent Fire Arms Mfg. Co.*, Hartford, Conn. These controls can be sup-

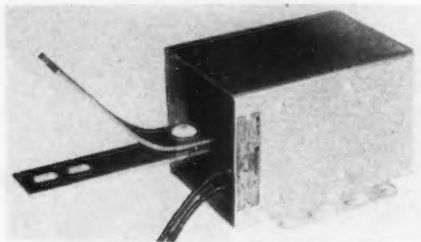


plied with either two or three poles, 230 volts a.c., 15 to 100 amp. They provide automatic protection against short circuits and overloads either through thermal or magnetic trip, depending on whether a time lag on the interruption of overloads is desired or not. Tripping is indicated by a visual signal on the outside of the box. Resumption of service is effected by a simple movement of the operating handle after the cause of the interruption has been removed. No parts need be replaced inside the breaker which is sealed at the factory to eliminate any possibility of tampering.

Similar multi-breakers of identical ratings are produced by a number of other companies. *Square D Co.*, Detroit, has a product which combines a thermal element which affords a time lag on momentary overloads, while a magnetic trip will cause instantaneous tripping on heavy short circuits. Thermal trip action alone of the bi-metal strip type is built into the products of *Westinghouse* and *Cutler-Hammer*, and *Cutler-Hammer's* control is available in three or four poles solid neutral types only. An indicating target on the covers show when these multi-breakers have tripped.

Outdoor Current Transformer

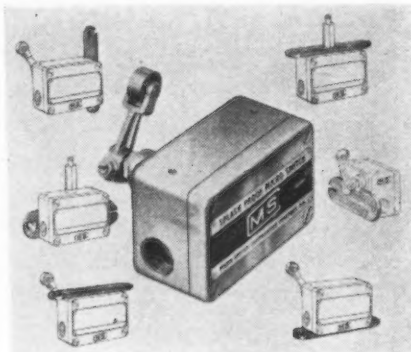
DESIGNED for low voltage, outdoor metering service, a new 1200 volt WO-1 dry type current transformer is announced by *Westinghouse*. It has three ratings, 200/5, 400/5 and 600/5 amp. The design permits long range accuracy, since it is good for 150 per cent normal current continuous operation without exceeding 55 deg. C. temperature rise. Mechanical strength against overcurrent is 250 times normal current r.m.s. first peak, and thermal capacity of the windings will permit 70 times normal current in 1 sec. The end frames of the transformer completely surround the wound type coils, bracing them against short circuit cur-



rent. Transformer is enclosed in a welded steel case with strap primary terminals and the mounting plate is slotted for pipe frame or single cross arm mounting.

Splash-Proof Micro Switch

PRECISION switch for use as a splash-proof interlock, limit or push-button switch is announced by the *Micro Switch Corp.*, Freeport, Ill. It works well where closely held operating points and movement differentials are needed and where any splashing may occur. Two tapped holes for screws on each of four sides make it possible to mount the switch directly to a machine frame from practically any position. If lug or foot mounting is desired, 3/16 in. mounting plates can be furnished. The switching element is a Bakelite Micro switch with precision operation, ample



overtravel and long life. It is Underwriters listed at 1200 watts up to 600 volts a.c. It can be supplied with a variety of roller arm, cross-roller arm or push rod actuation.

Combination Starters

IMPROVED Bulletin 712 combination starters recently have been developed by *Allen-Bradley Co.*, 1311 South First Street, Milwaukee. By combining a magnetic switch with a hand disconnect switch in the same enclosure, wiring is saved and greater safety for the operator insured. Starters are available in four sizes and a variety of enclosures with or without fuse clips. Ratings range from 2 hp., 220, 440, 550 volts for the size 0 to 50 hp., 440-550 volts for size 3 starters. Interrupting capacity is at least 10 times the maximum rating. Locker rotor currents are disrupted by either the solenoid or the disconnect switch. The switch lever

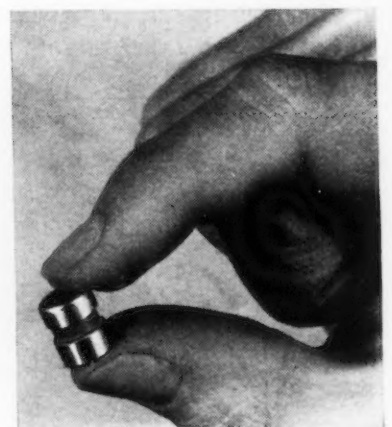


is at the front of the cabinet and has three positions. One, two or three padlocks may be used to lock it in the Off position.

This firm also produces a new solenoid starter, size 4, Bulletin 709. This unit has a maximum horsepower rating of 50 hp. 220 volts and 100 hp., 440, 550, 600 volts. Starter has double break, cadmium silver contacts, encased in an arc hood. There is only one moving part, no bearings, pivots or hinges. Currents of at least 10 times the maximum horsepower rating are easily interrupted.

Mercury Switches

TWO new mercury switches bringing larger capacity to smaller dimension are expected to open up many new applications. *Durakool, Inc.*, Elkhart, Ind., has designed the new No. A-5M and No. A-10Z to carry greater currents and retain the small size. Model A-5M requires a slight angular tilt for operation and is especially adapted to snap acting mechanisms, as well as tilt action. It can be used in a great many applications which formerly required the 10 amp. switch. Similarly the A-

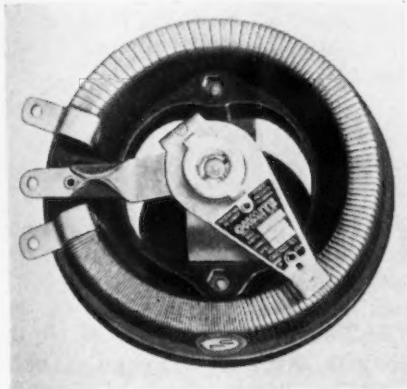


10Z covers some cases where a 20 amp. switch used to be specified.

Also a very small mercury switch has been brought out by *Durakool*, the Tipit, as illustrated, with a capacity of $\frac{1}{2}$ amp. at 24 volts and 4 amp. at 6. This mechanism is most useful where infrequent operation of a low-watt circuit is desired, but also for explosive atmospheres and on electrical machinery.

Generator Field Rheostat

SMOOTH, close gradual control of generator voltage is provided by generator field rheostats produced by the *Ohmite Mfg. Co.*, 4835 Flournoy Street, Chicago. Compact vitreous enameled construction insures consistent performance and exact control and simplifies design problems for generator and switchboard designers.



Economy in space and weight makes them particularly useful on portable equipment. Ohmite field rheostats are tapered or uniformly wound, as required, designed to provide control for separately or self-excited generators. The wattage sizes are available from 25 to 1000 watts.

Voltage Tester

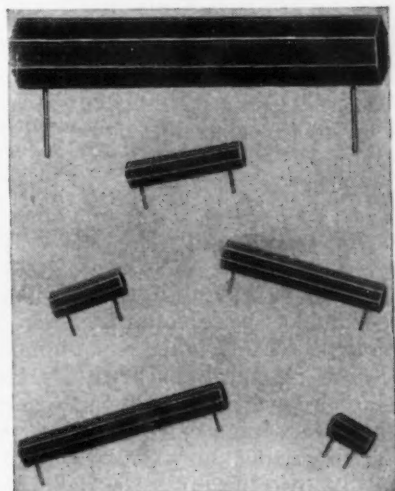
SEVERAL improvements are announced for the No. 5000 voltage tester of the *Square D Co.*, Detroit. The use of different colored bands for each voltage, together with increased travel of the pointer at the higher voltages makes possible easier readings. A.c. is distinguished from d.c. by the vibration of the pointer, which is flush with the outside of the case. The operating mechanism has been strengthened and improved to provide even greater accuracy. The long rubber-covered



lead wires are fitted with hooks and with sharp points for piercing wire insulation without damage. Steel strands in the wires make the leads capable of resisting considerable strain without breaking.

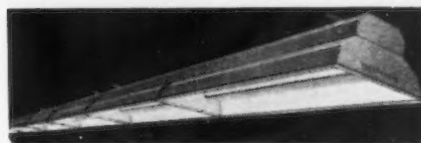
Compensating Resistors

NEW line of resistors has been introduced by the *Keystone Carbon Co.*, 1935 State Street, Saint Marys, Pa. The material is a hard, black, non-metallic substance, which decreases in electrical resistance with an increase in temperature. This property makes the material useful where it is desired to reduce or eliminate initial current surges, to provide temperature compensation in equipment which exhibits rising resistance with increase in temperature, and for other applications where a negative temperature coefficient is required. Change of resistance with temperature occurs in the region of ordinary temperatures, from 0 to 150 deg. C. The units remain stable for a long period of time, provided they are not excessively overloaded. They are mechanically strong and can be supplied in a variety of shapes and sizes.



Continuous Line Fluorescent Lighting

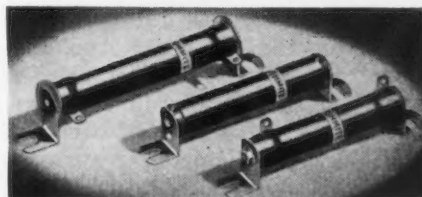
MORE light at lower cost is provided by the RLM Lite-Line fluorescent lighting produced by the *Benjamin Electric Mfg. Co.*, Des Plaines, Ill. Units use 48 in. Mazda lamps and are available in single and double reflector lengths. They may be joined together in series to form a continuous fixture of any desired length and may be installed in or suspended from the ceiling. The illumination provided by the twin lamps may be increased by one-third at any time, if this



should become desirable, when two lamps are installed in a triple lamp reflector. Only additional auxiliary equipment need be fitted.

Resistors

WIRE-WOUND, vitreous-enameled resistors are available from *Ohmite Mfg. Co.*, 4835 Flournoy Street, Chicago, in core sizes from $\frac{9}{16}$ to $2\frac{1}{2}$ -in. diameter. Live bracket types have flexible leads connected to tin-plated brass brackets. They mount and connect by bolting the slotted brackets to panel terminals. Dead bracket resistors are mounted by

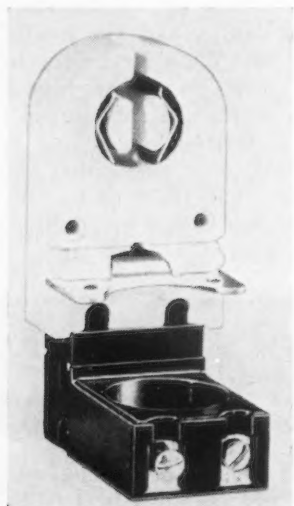


bolting to the brackets. Electrical connections are made separately to the lugs. The bracket for one, two or three resistors are mounted by means of through bolts. The leakage distance can be regulated by the use of mica washers or by having the lugs located as far in as required.

Socket for Fluorescent Lamps

COMBINATION lampholders, starter sockets and starters for Y-17 100-watt fluorescent lamps making for easier replacement and greater holding power have been

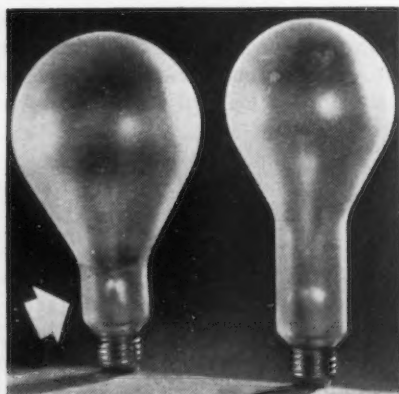
announced by the *General Electric Co.*, Bridgeport, Conn. The lamp-holders are of the rotating lock type and are available with or without mounting brackets. Start-



ers may be replaced without removing lamps from fixtures, especially desirable for ceiling fixtures. No additional wiring is necessary and two or four contact starters can be used in the new starter sockets. A quarter turn in either direction locks the lamp so that it cannot be jolted or jarred loose and another quarter turn in either direction frees the lamp.

Vibration Service Lamps

SHOCK and vibration which ordinarily impair the efficiency and life of electric light bulbs can be overcome by the vibration service lamp of the *Wabash Appliance Corp.*, Brooklyn, N. Y. It has the same length as an ordinary lamp, but is made with a larger over-size bulb of wider diameter to increase the convectivity of the heated argon and nitrogen gases inside, lowering the temperature of the bulb. The filament of the new lamp is cushioned against shock and concussion



by four molybdenum pigtail springs welded to six flexible supports. A nickel neck reflector disk welded to a seventh support serves to reflect light away from the neck of the bulb. Lamps can be supplied in 100, 150 and 200 watt, for voltages from 110 to 250 volts, frosted or clear. Average life is 1000 hours.

This firm has extended the line of sealed silver Birdseye lamps (which carry their reflector in the shape of a silver deposit inside the bulb) to voltages from 220 to 300 and capacity of 100 to 1000 watts.

Fluorescent Lamp

LAATEST industrial fluorescent unit announced by *Hygrade Sylvania Corp.*, Salem, Mass., is the F-235 with an output of over 8400 lumens, with two of the new 100-watt fluorescent lamps. Wider spacing and mounting near the ceiling in high studded areas is made possible. Reflectors are easily demountable for cleaning. They are drawn from a single piece of 20-gage metal and there are no bolts or nuts to break up the smooth surface. Working parts are in the housing, which is connected to the reflector by a latch assembly. Unit is supplied with Mirastats starters.

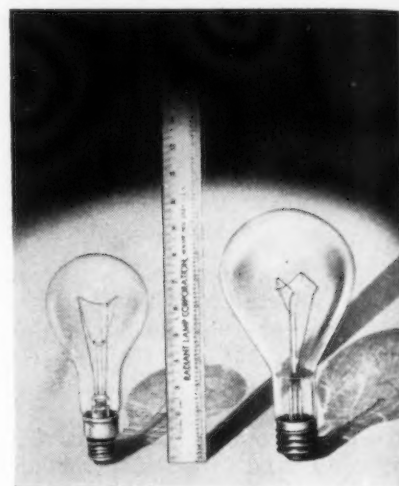
Insulating Material

VARNISH - SATURATED tubings for insulating bare wires or for increasing the dielectric strength of insulated wires when used as leads, connecting wires, etc., has been announced by *General Electric Co.*, Bridgeport, Conn. Tubings are made of closely woven cotton yarns impregnated with insulating varnishes. The varnishes penetrate all through the tubing rather than forming veneer laminations on the surface. They are very flexible, high in dielectric strength and low in moisture absorption. Black or yellow tubings are available in three grades from 20 to minus 1½ size.

High-Wattage Lamp

A NEW type high-wattage lamp makes possible an increase in candlepower of lighting equipment without changing fixtures. By the use of a hard glass bulb the size of a 500 watt lamp can be reduced to that of an ordinary 200 watt bulb and it also permits the lamp to

withstand thermal shocks when used outdoors. The new lamp was originally designed for explosion proof fixtures and can be fitted into any medium screw base, as in



household fixtures. The maker is the *Radiant Lamp Corp.*, 255 Sherman Avenue, Newark, N. J. Sizes of industrial lamps up to 10,000 watts are now being made.

Heavy Duty Plugs

LINE of heavy duty plugs, receptacles and cord connectors for use with portable electrical equipment has been brought out by the *Pyle-National Co.*, 1334-58 North Kostner Avenue, Chicago. These plugs are designed for heavy duty and have interchangeable two, three, and four pole contact units. To make any desired assembly combination they permit the use of a wide variety of plug shells and receptacle housings to make any desired combination. Contact units are reversible for safety protection. Enclosed female contacts may be assembled in either plug shell or receptacle housing, depending upon which is connected to the live line of the circuit.



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WE at Revere have always felt that we have, not "customers", but friends. Certainly, this has been our way of looking at it, because we have thought of your order not only as so many pounds or tons of metal—but as a valuable opportunity for us to make you feel glad you came to Revere for copper or copper alloys.

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Revere Technical Advisory Service will, however, continue to work closely with you, bringing to bear on your problems all of Revere's extensive knowledge of materials. In some cases we have been able to guide our customers into Defense contracts in which priorities work for them instead of tying their hands. So get in touch with Revere—together we may find a way of changing "No" to "Yes".

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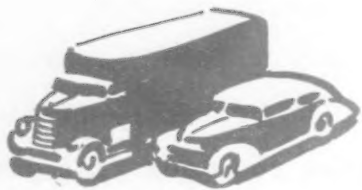
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THE IRON AGE, August 21, 1941—65

Assembly Line

- Bright metal still being used on 1942 models ... Chrysler to stress added horsepower ... General Motors line will adopt advance streamlining ... Plastics to be used more liberally by Ford.



DETROIT—Everyone is due for a surprise when the automobile industry publicly unveils its 1942 models. A review of changes which will be seen is timely.

Briefly, the changes this year are those inspired by (A) the desire to present something new enough to the public to attract and hold its attention; (B) materials shortages, attributable to the defense program, and (C) the necessity for trimming costs in certain directions to make up for increases which cannot be avoided in other directions. Summarizing, we can say:

1. Few mechanical changes will be made, but many of the cars will introduce variations of the fluid coupling and automatic transmission. One line of cars will offer more powerful engines which were redesigned in the process of switching from aluminum to cast iron pistons.

2. Sheet metal and body changes will be rather extensive. Concealed, full-width running boards are in favor. One major line of cars will offer new body styling that is important.

3. Some gadgets and accessories will be left off. This will reduce costs and also will offer dealers an extra opportunity to profit through sale of these ex-

tras and to collect labor charges for installation.

4. There will be fewer models in some lines of cars, with cost reduction the goal, but other manufacturers are adding body styles.

5. Surprisingly the industry is using a large amount of "bright metal" even though the public is mentally conditioned to accept cars without any glitter. Sales departments seem to demand glitter anyhow. One executive said his company might have foregone the use of bright metal but knew that competitors were not planning to do the same thing; therefore, chrome plate is being used in every conceivable spot on the cars. How long it will last is anybody's guess. The cars are designed so paint striping can be put on when the bright metal strips are taken off.

6. There is concern over the ability to obtain necessary deep-drawing steels for fenders and some of the hoods. Parts have been laid out for alternate methods of manufacture that will include stamping in sections and welding the sections together.

Many fenders already have skirts separate from the main fender stamping, like those on Ford's 1941 models.

7. Prices will be up, and this is said advisedly, knowing that OPACS probably will object. Ten per cent and more is estimated.

THE generalities apply to the industry as a whole but there are some specific points of interest. Only one car has been shown to the press with accompanying shush-shush. Several of the manufacturers have already begun to publicize some of the details about specific models. Among the things that will be ballyhooed by various manufacturers are the following:

GENERAL MOTORS: This entire line of cars is reported to have put into practical form the motif of Harley Earl's "car of the future." Earl, who is director of the General Motors art and color section and a leading stylist, rebuilt a Buick two years ago for his personal use and incorporated principles that will be seen in 1942 models. Styling is very advanced streamlining, making the cars very low and broad. In this line Buick



SUPERCHARGER: These machinists are assembling the supercharger to a Packard marine engine.

Photo by Harris & Ewing

Are You Machining Heat-treated Alloy Steel...300 to 400 Brinell?

CONSIDERABLE heat treated material is machined with standard cutters, taps, etc., but as is the case in most specific applications, specially designed tools operate more satisfactorily and usually more than offset the additional expense involved in their purchase. We recommend that the following details be incorporated on various cutting tools in use on the hard materials.

On cutters the relief should be reduced to approximately one-half the normal standard relief. Standard rake is often satisfactory but best results usually are obtained by the use of rake best suited to the work. Helical flutes usually produce better results because of the greater side-shearing action. Coarse teeth, slow speeds and heavy feeds tend to keep cutting edges working with less tendency to glaze over the cutting surface.

Taps should have positive rake with straight faces, and preferably full eccentric relief and narrow lands to reduce friction. Taper taps should have reduced relief to provide additional strength to the cutting edges and also to shear chips off closely on reversal.

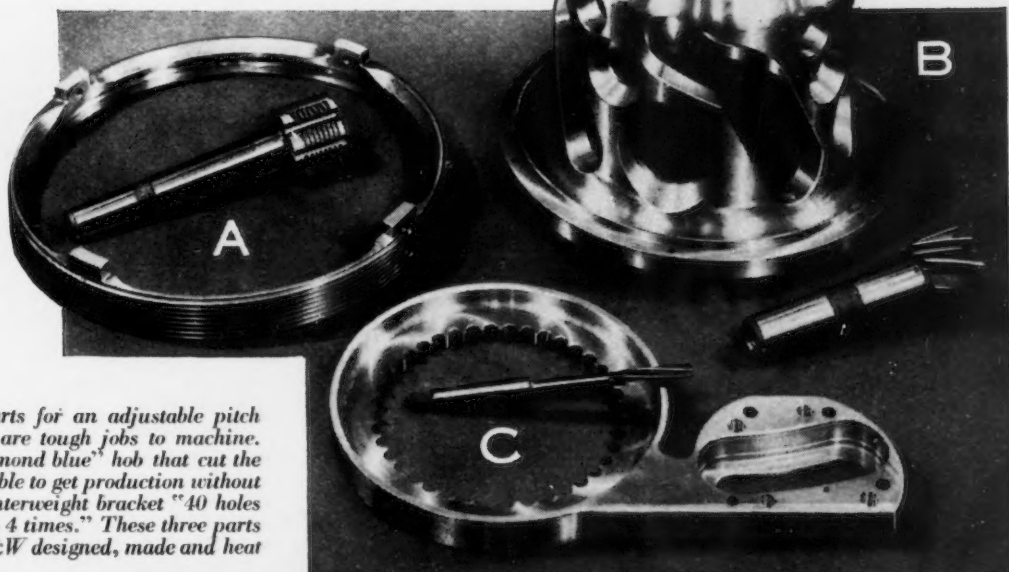
Reamers should be of the blue helix type with right hand cut and right hand spiral. A secondary chamfer usually will produce exceptionally fine finish in reamed holes.

Saws should have staggered teeth and side chip clearance. Reduced relief is necessary on this type of tool.

Turning tools should have reduced clearance angles for greater strength. Top and side rakes of 8° to 10° are quite satisfactory.

Sulphur base cutting oils are generally more satisfactory than the soluble or emulsified types of oils. Due to the extreme tenacity of the chip in heat-treated materials, much heat is generated and a large volume of oil should be used.

Our engineers will be glad to help you get the best production on these tough jobs. Write to PRATT & WHITNEY, Division Niles-Bement-Pond Co., West Hartford, Connecticut.



These are heat-treated alloy steel parts for an adjustable pitch airplane propeller . . . and they are tough jobs to machine. A—dome retaining nut and the "diamond blue" hob that cut the thread. B—stationary cam "impossible to get production without specially designed cutter." C—counterweight bracket "40 holes reamed . . . production increased 2 to 4 times." These three parts are between 300 and 415 Brinell! P&W designed, made and heat treated the tools that licked them.

PRATT & WHITNEY

ONE OF A SERIES TO MAKE PRATT & WHITNEY RESEARCH AVAILABLE TO AMERICAN SHOPS

will be on a longer wheelbase, it is reported. Buick also will feature as a mechanical improvement an artificial roughening of bearing surfaces. This is in direct contradiction to the more plausible sounding story, the one that the public mind is more ready to believe, that smooth surfaces are the most perfect. Buick will stir up a lot of controversy with this feature and its story will be directly competitive with the Chrysler Superfinish story.

Cast iron pistons will be used in the GM cars which have not had them heretofore, that is, Buick,

cars"—the designs will have to last that long at least before new ones are brought out.

CHRYSLER: The entire Chrysler line of cars is going to make its appearance with a lot of emphasis on added horsepower. Larger engines appear to have been scheduled for production along with cast iron pistons in place of aluminum. The engine size has a direct relationship to the piston material: in changing to heavier pistons it was necessary to change bearing sizes, connecting rods, etc. Eventually the designers settled on larger bore, slower-speed designs.

Plastics will be more liberally used on the Ford, and some of the trucks have already had plastics substituted for metal on exterior trim. Ford has made a lot of changes in recent months to conserve materials, although most of them cannot be seen in casual examination of the cars. These changes will carry through on 1942 models. Ford has some sort of fluid coupling available, probably at extra cost for use on Mercury and Lincoln Zephyr cars.

The above covers the Big Three; the same type of information on cars manufactured by the independents will be published in a forthcoming issue.



Photo by International

FORD'S PLASTIC CAR: Lowell E. Berly, designing engineer of Ford's new plastic automobile, is shown seated in the car as he showed it to 10,000 persons at the Dearborn, Mich., annual community festival. The car, mounted on a tubular welded steel frame, has a superstructure composed entirely of a plastic fiber.

Olds and Cadillac. As a matter of fact, the last 7000 Buicks off the line in the 1941 series had cast iron pistons. There is a lot of question about whether Buick will continue with dual carburetion; at least, die cast carburetor bodies will be out of the picture. Even if cast iron throttle bodies are used, it must be remembered that cast iron is now on priority and Buick customers may have to be satisfied with the usual one carburetor per engine.

BRIGHT metal will be seen on all these cars: as a matter of fact, Olds is boasting about the biggest and brightest bumpers it has ever offered the trade.

The splurge in design is being explained by saying that, after all, these are going to be "two-year

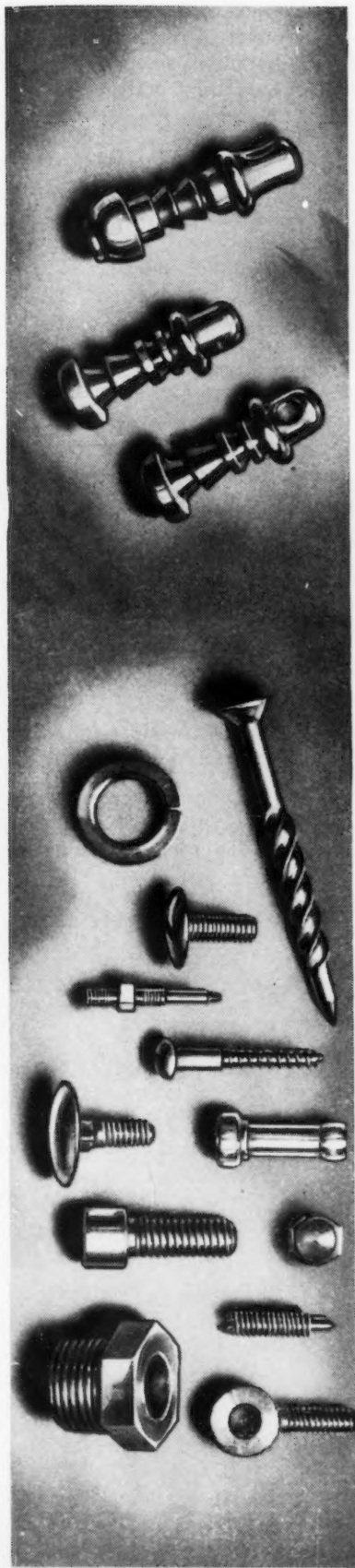
The Chrysler car, itself, is said to be distinguished by sensational body styling. DeSoto is one of the spots where worry has been expressed about the continued possibility of obtaining deep drawing steel because shortages of aluminum may prove to be a bottleneck. This would curtail production of the very ductile material needed for fenders.

FORD: This company feels relatively well protected on the question of deep drawing steel because it operates its own steel mill and might be able to use ordinary age-hardening types soon enough after rolling so that the deep drawing material would not be necessary. However, Ford has had problems in the past with deep drawing and during the year just ended has had three-piece and two-piece fenders.

General Motors, 5 Other Firms, Get Defense Leases

• • • Agreements of lease with seven manufacturers have been made by the Defense Plant Corp. for expansion of defense facilities, the War Department announced recently. Title to the facilities purchased and constructed by the companies involved will be retained by the Defense Plant Corp.

The companies whose plants are to be expanded include: General Motors' Buick Motor Division, which will install \$10,267,043 worth of additional machinery and equipment for making aeronautical engines and parts, in its Melrose Center, Ill., and Flint, Mich., plants; General Motors' Fisher Body Division, Detroit, which will add \$894,001 worth of aircraft parts making machinery; New Britain Machine Co., New Britain, Conn., which will expand automatic screw machine manufacturing facilities at New Britain and Berlin, Conn., for an estimated \$650,000; Pipe Machinery Co., Cleveland, which will install \$200,000 worth of gage making machinery and equipment; Hudson Motor Car Co., Detroit, which will add \$166,886 worth of aircraft parts making machinery and equipment; Huck Mfg. Corp., Detroit, which will expand its aircraft rivet manufacturing equipment by \$84,490; and Lees-Bradner Co., Cleveland, which will install \$19,033 worth of additional plant facilities for manufacturing thread millers and other machine tools.



How Carpenter Free Machining Stainless Steels

*are relieving pressure on
production*

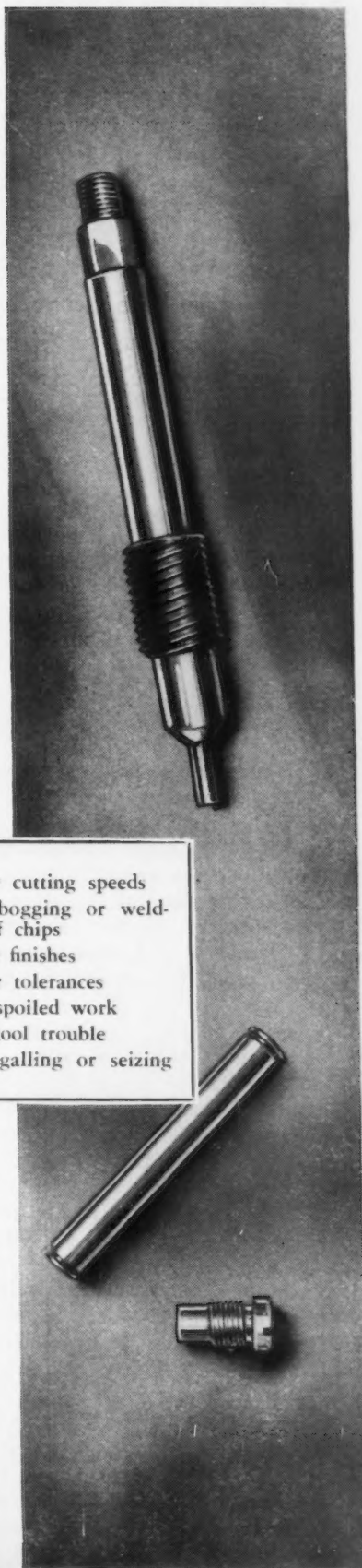
In these days when machine shops are jammed with waiting work, every bar of Carpenter Free Machining Stainless is doing its bit to relieve the pressure. Cutting speeds as high as 120 to 200 surface feet per minute chase this Stainless through the shop. The free machining qualities prevent unnecessary production interruptions usually caused by galling, seizing and loading up of the tools.

Yes! Carpenter Free Machining Stainless has always been a timesaver for the fabricator. Today all of its time saving advantages are fully employed in relieving the pressure created by the defense emergency.

Busy as we are, we are never too busy to answer your questions, or to supply you with information that will aid in solving stainless fabricating problems. Your Carpenter representative is ready to give you the benefit of his experience and to supply you with helpful literature, that will overcome production difficulties.

THE CARPENTER STEEL CO.
READING, PA.

- ★ Faster cutting speeds
- ★ Less bogging or welding of chips
- ★ Better finishes
- ★ Closer tolerances
- ★ Less spoiled work
- ★ Less tool trouble
- ★ Less galling or seizing



Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington

• Quarter million federal payrollers (only 600 of them elected) fight for living space . . . Centralization of U. S. government continues as states give up more of their rights . . . trend began with Coolidge.



WASHINGTON—Nature will not permit power to remain where that power is not used.

These words were sandwiched in with the closing remarks made recently on the floor of the House by Representative Hatton W. Sumners, Democrat of Texas, Chairman of the Committee on Judiciary. He was speaking on the enormous growth of bureaucracy in the federal government. The subject has been given close study for almost a score of years by Mr. Sumners, an unusually able lawyer and forthright legislator. He is of the old-fashioned school that still believes in state's rights and is disturbed over the vast expansion of federal bureaucracy. It started, he said, 17 years ago under Calvin Coolidge. It was mild then when compared with the galloping headway it has made the past eight years.

"If you want to destroy this democracy take from the states the governmental responsibilities they have to exercise in order to preserve their governmental vigor, and you destroy the states," Representative Sumners said. "Destroy the states and you destroy democracy. If we had sought to devise a plan for the destruction of this democracy, and get by the people with it, we could not have devised a plan more suited to that purpose and more certain of results than the one we are pursuing."

The discourse by Representative Sumners was inspired by a resolution introduced by Representative Sabbath, Democrat of Illinois, proposing that a committee be set up to investigate the "feasibility" of transferring some of the multiplicity of government bureaus that have been piled up endlessly in Washington.

THE Nation's capital, teeming with some 250,000 payrollers, has been as packed as a sardine can and desperate search is being constantly made for space and more space as apartment houses, private residences and private office buildings are arbitrarily grabbed right and left by bureaucrats. The resolution was defeated, which is not important one way or the other, but it was made the occasion for interesting discussion showing the fast drift of the country toward an overpowering centralized government. Most members who discussed the resolution appeared to be interested in trans-

ferring bureaus to their own particular districts, seeing that this would mean juicy political patronage. But then there was a minority whose idea of "decentralization" appealed to taxpayers who are called upon to support this mass of bureaus and their many time-serving employees. This minority simply would abolish scores of these useless, costly bureaus.

These bureaus are scattered throughout Washington and even its outlying districts, some of them in ornate spacious government buildings, while others are housed, some in lavish and others in stuffy quarters, in 201 private buildings and apartments at an annual rental of \$5,054,000.

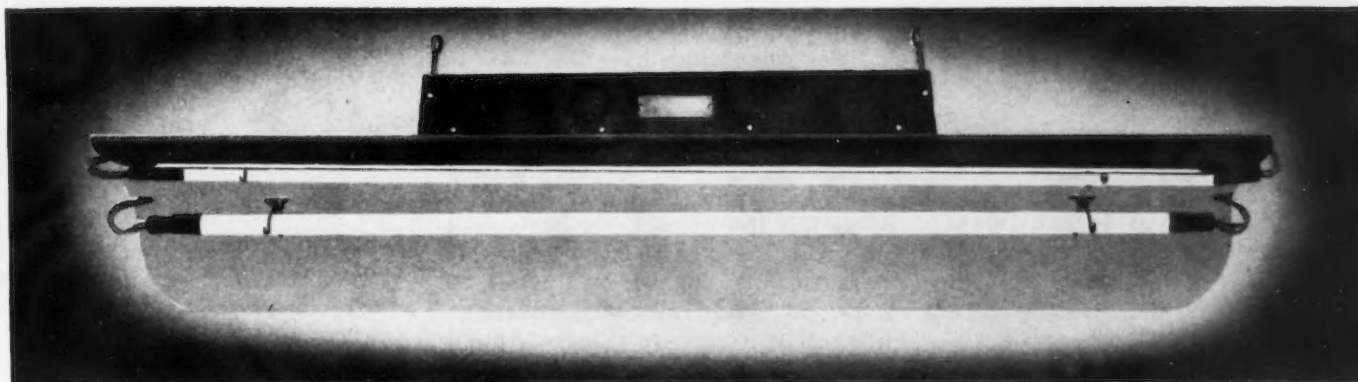
But as Mr. Sumners pointed out, there is no use in talking about the increase in the number of bureaus so long as federal power is increased.

"It is a waste of time, it is nonsense to decry our bureaucratic development while this trend to bring all governmental powers to Wash-

NO FISH: These newsmen at President Roosevelt's executive office were told last week that the chief executive (meeting Winston Churchill and other British warleaders at sea) was fishing.



NOW YOU CAN HAVE "BETTER THAN DAYLIGHT" IN YOUR PLANT



RF fluorescent luminaires are made in one and two-lamp units. The two-lamp unit shown above measures approximately $63\frac{1}{2}$ " x $15\frac{1}{2}$ ". The reflector surface is white porcelain enamel. Each lamp is approximately $57\frac{1}{2}$ " long (less prongs) and $1\frac{1}{4}$ " in diameter. Each lamp is rated at 4000 lumens.

WITH NEW SIMPLIFIED RF FLUORESCENT LAMPS AND LUMINAIRES

GENERAL ELECTRIC'S NEW RF (rectified fluorescent) lamps now make it possible for every industrial plant to enjoy "better than daylight" 24 hours a day . . . with lower installation cost, lower operating cost, and lower maintenance cost than was ever before possible. The following advantages tell why:

LOWER PRICES—Effective August 1st, RF 85-watt, industrial-white and blue-white lamps are reduced from \$4.25 to \$3.65.

HIGH POWER FACTOR—New circuit operates at better than 90% power factor.

HEAVY-DUTY CONSTRUCTION—Basically, it's the same rugged, Cooper-Hewitt type of lamp used industrially for over 30 years . . . now improved by adding a fluorescent powder coating.

LOW INSTALLATION COST—Existing wiring is frequently adequate, and the complete luminaires are assembled readily and easily suspended with the two-point hangers supplied as part of each luminaire.

LOW MAINTENANCE COST—The average cost of power for operating a two-lamp RF unit is $\frac{1}{4}$ cent per hour. Since the average life of the RF lamp is 3000 hours, lamp renewals are infrequent.

NO VOLTAGE ADJUSTMENT—None is required since the RF lamp operates over a wide range of voltages and is not so sensitive to voltage variations as most types of lamps.

NO MOVING PARTS—Lamp starts almost instantly, without starter units.

New simplified RF lighting is efficient, economical, and dependable 24 hours a day. In addition, it is cool, practically shadow-free and has minimum stroboscopic (flicker) effect. Because it helps workers see faster, it is being extensively used in the nation's defense industries. Find out today how little it will cost to install G-E RF lighting in your plant. See your G-E lamp distributor for prices and complete information. General Electric Co., Nela Park, Cleveland, Ohio.

G.E. MAKES ALL KINDS OF LAMPS FOR INDUSTRIAL LIGHTING

To provide "better than daylight" in all kinds of industrial plants, General Electric makes many different kinds and types of lamps, including:

MAZDA F (fluorescent) lamps that come in several sizes in white, daylight, soft white, and five colors.

MAZDA H (mercury) lamps that have long life and high efficiency. The 400-watt size delivers approximately 40 lumens per watt.

MAZDA C (filament) lamps that are available in 15 to 1500-watt sizes, many of them with inside frosted, silvered, clear, or white bulbs.

GENERAL ELECTRIC

ington," Mr. Sumners continued. "You can put that in your pipe and smoke it, as the expression goes. . . . Bureaus are not the cause; they are the result. In order to get at the result we have to reach the cause. We members of Congress do not know what it is all about. . . . I mean that under the policy of taking from the states powers which are within their governmental capacity we have so overloaded the federal government machinery that we cannot properly take care of the federal business, and everybody knows it."

Pointing out the significant fact that this gigantic federal bureaucracy has less than 600 elected, Mr. Sumners said that there is no governmental machinery that makes it possible for it to function as the general governmental agency for democracy.

MR. SUMNERS did not say so but he might well have explained that the building up of this federal bureaucracy has been possible only by reason of the

supine attitude of states that surrendered their rights and responsibility in return for largesse from the federal treasury; the attitude of Congress itself, giving up its rights in return for patronage; and the attitude of voters for showing indifference to the movement.

Here's how far the movement has gone, in the opinion of Mr. Sumners:

"We are moving in the direction of having in effect a lot of little kingdoms while those in charge make rules which have the force of law; construe these rules and enforce them. There is no doubt about it. The people do not elect those into whom we are moving this governmental power and who exercise it without any effective supervision by anybody whom the people elect. Nobody is going to question that. We are developing a system of government in America that is more like the system of government during the days of the Louises of France than a democracy—when court favorites were powerful in determining governmental policy."

28,482 Republic Men for SWOC

Washington

••• Activities of the National Labor Relations Board during the past week included:

1. Announcement of a preliminary progress report of a payroll check among employees of Republic Steel Corp., indicating that the SWOC employees in good standing numbered 28,482 out of a total company payroll of 40,585 employees. A verification of the accuracy of SWOC membership cards is currently being investigated in the field.

2. Dismissal of a petition which sought certification of AFL's longshoreman's union at the National Tube Co., United States Steel subsidiary at Lorain, Ohio.

3. The scheduling of a collective bargaining election for warehouse and shop employees at the New Orleans (La.) shop and warehouse of Jones & Laughlin Steel Co. They will vote for the AFL's bridge structural and ornamental iron workers union, the Independent Employees Mutual Association, or for neither.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Discrimination in Hiring Banned on Future War Work

Washington

••• All contracts let in the future by the War and Navy Departments and the Maritime Commission will include a provision binding the contractor against discrimination in employment because of race, creed, color or national origin, according to Mark Ethridge, chairman of the newly appointed President's Committee on Fair Employment Practice. This step was described as conforming with a Presidential executive order of June 25.

Ethridge also reported that 27 large defense contractors have changed employment practices with regard to minority groups since the President's order. He said this development was regarded as significant because of the "industry-wide ban against Negro workers in airplane factories prior to the defense emergency."

The committee plans to hold hearings in the near future.

Pig Iron Pool Will Take 2% in September

Washington

••• Producers of pig iron were instructed last week to set aside 2 per cent of their September production in a pool, expected to total between 90,000 and 100,000 tons during the month, out of which allocations will be made to fulfill urgent needs.

The action, taken by OPM Director of Priorities Edward R. Stettinius, Jr., was in accordance with the Aug. 1 order subjecting pig iron to complete priority control. Mr. Stettinius said in a letter to producers that the 2 per cent figure "represents the minimum compatible with defense needs" and is "substantially less than the amount of pig iron which the integrated steel companies have regularly sold in the open market."

The intent, the letter said, is that all integrated companies will continue to carry their regular merchant load as formerly. It is not to be inferred by such companies that percentage withheld is to represent the total amount of pig iron which they will offer for sale on the open market, Stettinius said.

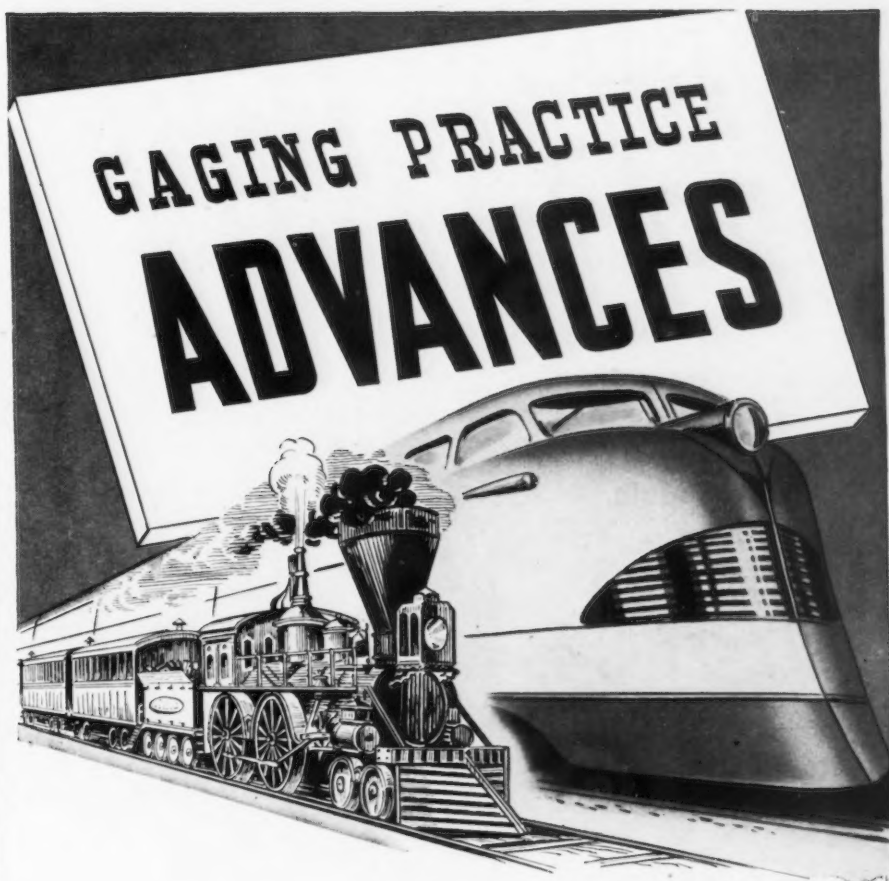
3 New Magnesium Plants To Raise Output 56,000 Tons

Washington

••• Defense Plant Corp., RFC subsidiary, last week signed a \$63,000,000 contract with Basic Magnesium of Cleveland, Inc., for the construction of plants to make metallic magnesium and other magnesium products necessary for the expanding aircraft program.

The plants, to be constructed in Mead, Gabbs, and Las Vegas, Nev., will have a gross capacity of 56,000 tons of metallic magnesium a year—more than nine times estimated United States magnesium production in 1940.

The new plants, together with a \$9,250,000 project undertaken by the Todd-California Shipbuilding Co., San Francisco, and the Ford Motor Co.'s \$1,000,000 magnesium castings plant in Detroit, are expected to make this country independent of all foreign magnesium sources.



Locomotives have improved vastly since those ambitious little wood burners struggled across the Union Pacific in the early 70's. The streamliner of today can do far more and do it much faster.



Never in history has progress been made more rapidly in precision gaging than in the last few years. Both standards of accuracy and gaging speed have made spectacular advances. The human equation, such an unpredictable factor just a few years ago, becomes much less troublesome.

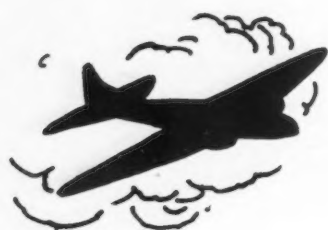
Sheffield has its part in this march of gaging progress. It was Sheffield which produced the automatic gage illustrated—also the Electrigage, the Multichek Electrigage, the Precisionaire, the Thread Lead Checking instrument and others. If you are not familiar with what these instruments have accomplished in increased accuracy and faster inspection, write us for the story.

THE SHEFFIELD
CORPORATION
Gage Division • DAYTON, OHIO, U.S.A.



WEST COAST

• Vultee only Coast aircraft plant so far to hire women (300) in large numbers . . . Steel priorities increase difficulties for western jobbers . . . OPM priorities agents named for Los Angeles, Seattle.



DESPITE many pictures in the tabloids, only one Pacific Coast aircraft plant and in so far as we know the only defense plant of any kind has hired women in large numbers for shop work. Vultee Aircraft, Inc., near Los Angeles, employs approximately 300 women in its shops.

The experiment began in April when a few women were brought into the electrical and radio sub-assembly departments, and into the trim department, where fabric is sewn onto control surfaces, such as rudders and ailerons. The project quickly passed from the experimental stage as the girls proved themselves to be highly efficient and competent in handling the light work assigned to them.

Vultee officials point out that the girls in no way are replacing men, nor are any men being let out because of the employment of women. Men are still being hired by the company, but they are being assigned to heavier types of work or more skilled operations. The men who formerly occupied the posts now handled by the women have been promoted to more important and more lucrative shop jobs.

The company now employs women on electrical and radio sub-assemblies, where finger dexterity is paramount; on masking work in

the paint shop; on the new mechanized final assembly line; on light drill presses and burring and filing operations in the machine shop; on inspection and on various sub-assemblies.

The women are paid the same rate of pay as men for comparable work, the starting wage being 60c. graduating to a minimum of 75c. per hr. after 12 weeks' employment.

Under the present Vultee schedule the highest they can hope to receive is \$1 to \$1.15 per hr. on milling work.

The company has found that no special consideration is necessary for the girls, and the only requirement they must observe is that they wear slacks during working hours.

So far the type of work assigned to women has required very little training, all of it on-the-job.

THE California Aircraft Schools Association, trade association of the numerous private schools which have been established in southern California for training aircraft personnel, estimates that 20,000 women will be engaged directly or indirectly in the crafts in 1942.

Incidentally, this body also declares that aircraft factories in southern California will need approximately 70,000 new employees for the remainder of 1941.

The Aircraft Schools Association does not concern itself primarily with the exact type of training offered by private schools, nor in tuition fees, but at least it represents a stabilizing influence in a field infested with shady promoters. As an example of the lines along which it is working, the association now recommends that a policy of "No Job-No Charge" be adopted by all schools.

The Aircraft Schools Association estimates that, as employer demand for women shop workers increases, a six to eight week training period for special skills should adequately prepare female candidates. At present there are about 100 women in training at Inglewood and Hawthorne public high schools, near Los Angeles, taking a 15-week course. These students will probably be employed at the nearby Northrop and North American aircraft plants upon graduation. Be-

yond these three aircraft plants—Vultee, Northrop and North American—the idea of employing women shop workers has not gone beyond the talking stage, but a survey of other plants in southern California finds all of them expressing willingness to employ women when it becomes necessary.

Possibility developed last week that a blanket priority rating may be asked for all small residential construction in metropolitan areas of southern California on the grounds that they are centers of defense industry. Request that such a rating be granted would come from a special subcommittee on priorities on defense construction materials of the Los Angeles Chamber of Commerce.

Need for this priority rating is felt particularly by home builders in obtaining reinforcing steel which, next to plates and special steels, represents the greatest steel famine on the Pacific Coast. Chairman of the subcommittee is N. E. Dawson of Soule Steel Co., Los Angeles.

The proposed rating would apply only to small residences—those costing under \$6,000. The tonnage involved would not be large, but would be sufficient to break the construction bottleneck.

THE National Defense Industries Committee of the San Francisco Chamber of Commerce reported last week that sheet metal shops in that city are experiencing growing difficulty in securing materials due to priorities given to defense industry. This scarcity, a surprise to no one, has been becoming more acute for some time.

Steel warehouses, who have been pondering the dilemma of whether to fill the demands of regular customers irrespective of their connection with defense work or whether to accept orders only from firms with defense contracts, may find their problem partly solved soon as non-defense shops find themselves unable to obtain such auxiliary materials as welding rods. Without such necessary auxiliary supplies, these shops would have little purpose in seeking steel.

One Los Angeles jobber has announced that he will accept orders from defense industries only. Inasmuch as this particular firm regularly does a large part of its busi-

WHICH OF THESE VITAL JOBS CAN POWDER METALLURGY DO FOR YOU?

If your productive capacity is overtaxed, if essential materials are hard to get, Moraine designers, engineers and powder metallurgists may help.

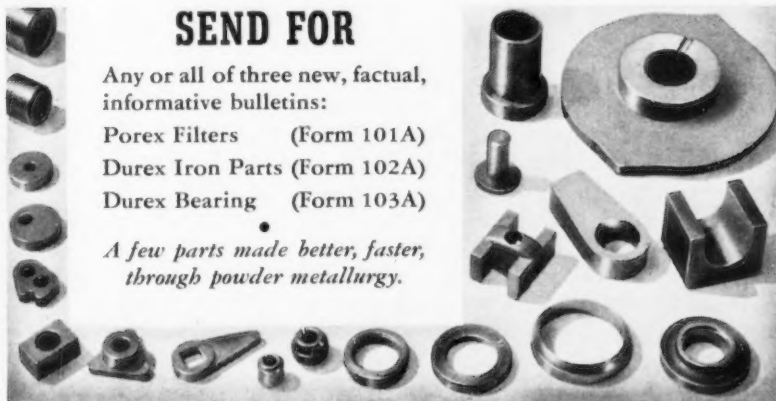
For today thousands of parts made by Moraine from metal powders serve industry along with products of casting, machining, forging, and other processes. Durex* oil-retaining bearings help motors and machines to run longer, more smoothly, with less maintenance. Porex Filters keep dirt, moisture, and trouble out of fluids such as lubricants, fuel oil, air, and gases. Durex Iron gears, cams, and machine parts simplify designs, improve performance, cut material and production costs . . . Check the growing possibilities of this important field as applied to your specific problems. Get in touch with Moraine.

SEND FOR

Any or all of three new, factual, informative bulletins:

Porex Filters (Form 101A)
Durex Iron Parts (Form 102A)
Durex Bearing (Form 103A)

A few parts made better, faster, through powder metallurgy.



*T. M. Reg. U. S. Pat. Off.

MORaine

Pioneer in Powder Metallurgy

MORaine PRODUCTS DIVISION

GENERAL MOTORS CORPORATION, DAYTON, OHIO

CONSERVE VITAL MATERIALS

Powder-made products eliminate scrap material loss in production, replace parts made by die-casting, screw machine, and other methods, substitute for costly or scarce materials.

SPEED PRODUCTION

In making parts from powders, one operation often replaces several, helps get orders out on time or ahead of schedule.

RELIEVE PRODUCTION JAMS

By permitting re-adjustments in production schedules and relieving hard-pressed machines for urgent jobs, parts from powders help get the most—fastest—from existing equipment.

INCREASE PLANT EFFICIENCY

Powder metallurgy offers many time and money-saving cuts to finished products, simplifies production and assembly methods, cuts rejects.

RELIEVE SKILLED LABOR SHORTAGE

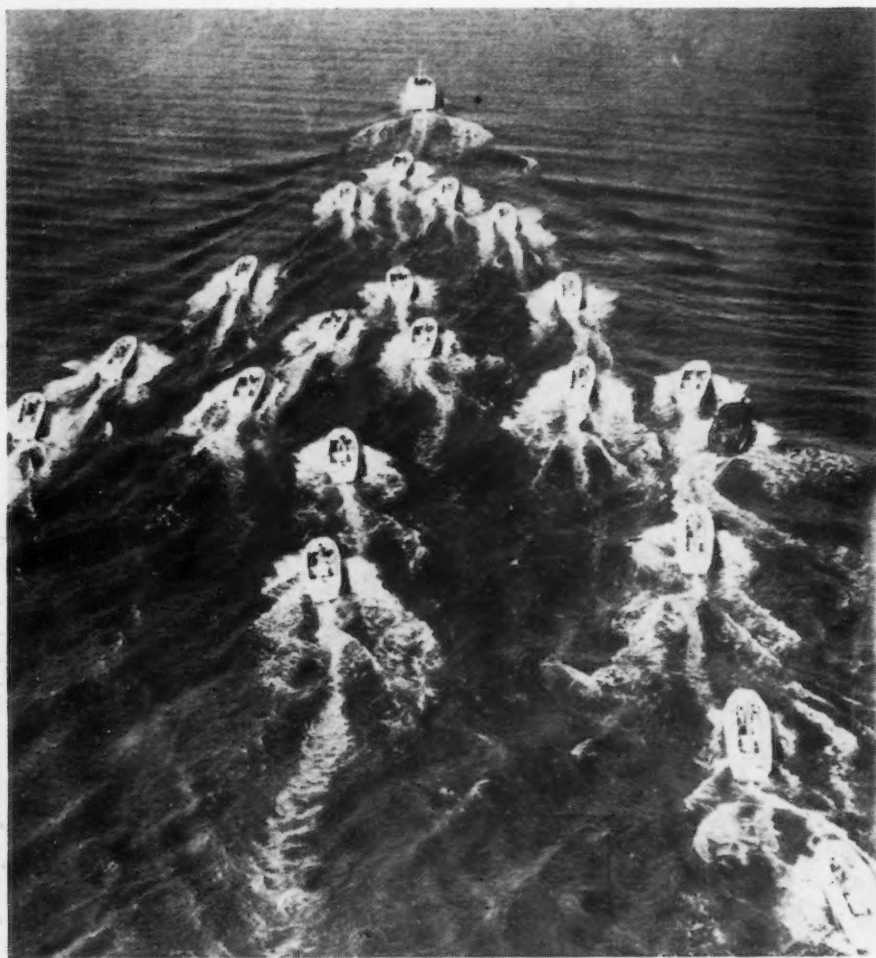
In replacing parts made by conventional machining methods, powder-products lighten up production loads on personnel, as well as on equipment.

SIMPLIFY PRODUCT DESIGN

Oil-retaining bearings have made design history by eliminating need for external lubrication, saving weight, improving performance, extending useful life of countless products.

CUT PRODUCTION COSTS

Operations eliminated, costly materials replaced, plant efficiency increased, assembly simplified, maintenance costs lowered—all these mean better products—faster—for less money.



INVASION, U. S. STYLE: Here are new U. S. Navy landing boats on Lake Ponchartrain, near New Orleans, La., during a drill. The boats are designed to carry 20 to 30 men with equipment and can be run aground under ordinary conditions without wetting the soldiers' feet.

ness with aircraft plants, this decision does not represent a clear-cut decision between serving old customers or turning them away to serve defense firms still wet behind the ears. In this case at least, the jobber can eat his cake and have it too.

A Seattle structural steel fabricator is completing work on the last of non-defense orders and will confine his activities henceforth entirely to defense work. This is because of the difficulty of obtaining structural steel for any but high priority jobs. A contractor recently awarded a post office and railroad station in Alaska declares that he is unable to find any Seattle supplier who will take his order for slightly over 100 tons of reinforcing steel.

Among Pacific Coast jobbers, those specializing on reinforcing steel report the greatest difficulty in obtaining stock replacements.

NAMING of OPM priorities representatives in Seattle and Los Angeles, as well as San Francisco, is heartening news to the Coast. At Seattle, the priorities office will be in charge of William D. Shannon. This office will concern itself with priority matters in Washington, Oregon, Idaho, Montana and Alaska. In charge of the Los Angeles office will be G. Howard Hutchins.

Mr. Shannon is former Northwest manager for Stone & Webster Engineering Corp. Mr. Hutchins, former president of the Filtrol Co. of California, has been associated with Clayton Mfg. Co., Alhambra, Cal., since 1937.

A rash of minor labor difficulties have hit Pacific Coast ship repair yards. At Seattle, the Navy has ordered work restricted to one shift in conversion of passenger liners to transports at the Todd Seattle Dry Docks. The restriction comes as a

result of union insistence upon double time pay for overtime. The issue, somewhat confused, appears to be triple pronged. The Navy is evidently more disturbed over higher shipyard labor costs on the West Coast than in the East or on the Gulf. A further difficulty lies in the custom of higher pay for ship repair work, so called "dirty work," than for new ship construction. Navy representatives are quoted as seeking to apply the time and one-half overtime scale used on new ship construction to repair work, and the unions are holding out for double time. A third point of the dispute lies in differences between wage scales in force at Navy yards and at private ship yards.

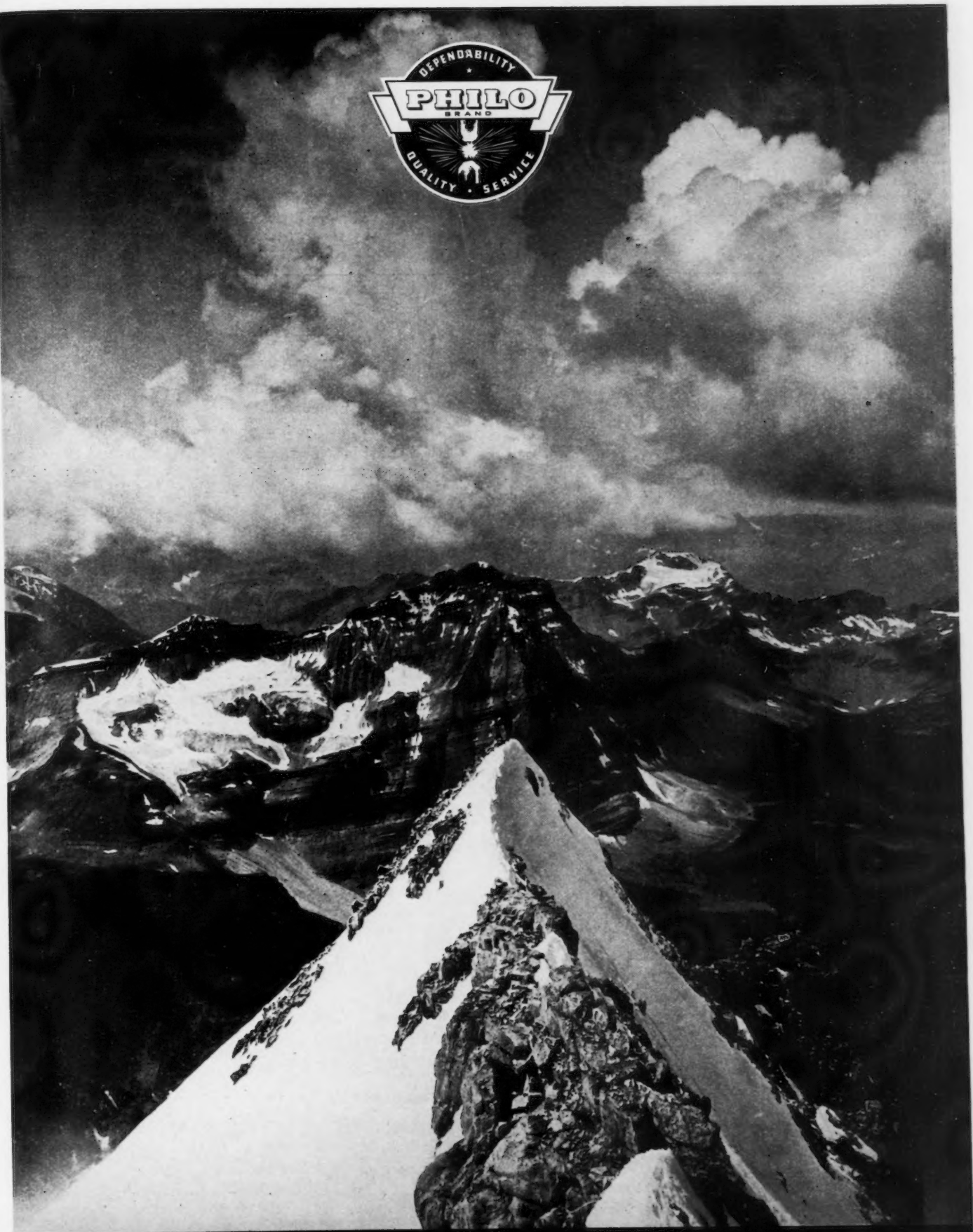
In San Francisco a CIO-AFL jurisdictional dispute is brewing over ship repair work. CIO unions have signed a contract with most San Francisco Bay region ship repair yards to the disappointment of AFL unions who wish to extend bargaining rights gained with new ship builders to the repair yards.

SHIPMENT of 1000 tons of scrap steel originally intended for Japan from British Columbia to a Seattle mill has eased the situation there. It is understood that 4000 tons more, which has been lying on a Vancouver dock since the Dominion government stopped shipments to Japan in 1939, will be diverted to the United States now.

Erection of a \$1,500,000 steel rolling mill in Vancouver, for which preliminary plans are now under way, would consume a substantial portion of the scrap now originating in British Columbia. Meanwhile, this province constitutes a supplementary source for Seattle mills.

About 9000 tons of 10-in. steel pipe for a 65-mile oil pipeline between Ventura and Wilmington, Cal., for Shell Oil Co., represents the largest oil pipeline order in recent months. The tonnage will be supplied in equal shares by Youngstown Sheet & Tube Co. and National Tube Co.

As this is written, hearings of the Senate committee investigating defense contracts are scheduled to be under way in Los Angeles. Failure of municipal facilities and services to keep pace with growing defense industry and vulnerability of power and water lines to sabotage will come under consideration.



Ohio Ferro-Alloys Corporation
Canton, Ohio

Fatigue Cracks

BY A. H. DIX

Cube Root Export Now Licensed

• • • An anonymous contributor in the Linde Air Products Co.'s New York office sends us a many-paged mimeographed bulletin issued by some firm's foreign department (the company name is carefully torn off), listing items on the national defense export control list. The list is alphabetically arranged. Under "C" are: "Cart-ridge Belt Links, Castings and Forgings, brass or bronze; Castings, zinc die; Copper Rotating Bands, Crossties, and *Cube Root Mixture containing 98 per cent cube root.*"

The italics are ours and express our astonishment only feebly.

Without Arms

• • • As you have noticed, you are now being supplied each week with a list of government orders for metal products (see page 101). We called this useful service to the attention of a tool manufacturer who is at the moment groping his way without the aid of your favorite family journal. He answers coldly:

We want you to know that we are not interested at all in manufacturing tools in connection with war or preparation for same. The writer has accepted the New Testament as his constitution and there he finds to love not only his friends but his enemies also.

Next week we will write him that we are now also publishing each week a handy summary of priority rulings.

Proofreader Nods

The thermometer is flirting with the 93 deg. mark; that may account for my being finicky, and stealing some of your anonymous "Deac's" stuff. My complaint is with this sentence of yours, "Major Bowie was on more intimate terms with gravity than any man since Isaac Newton."

Assuming that Major Bowie followed Ike by many years, your phrase indicates that he (Bowie) was on more intimate terms with gravity than he himself (Bowie), and that's impossible. He could have been on more intimate terms with gravity than any *other* man since Newton, but not more intimate terms that he (Bowie) himself.

E. C. (Clark Controller Co.) Roberts

Although we strive for exactness of expression, every once in a while the proofreader's seeing eye blinks and we fall flat on our syntactical snout. Sorry.

Synthetic Abortion

• • • This week there are more squawks than usual. The puristic A.W.M., who is apparently on a straight persimmon diet, snarls:

Your Aug. 7 list of military "slang" smells. I commend to you a study of the distinction between argot, cant, colloquialisms, dialect, idiom, jargon, patois, slang, vernacular and vulgate, to name a few.

"Gravel agitator," "crossbar hotel" and "hell buggy" are synthetic creations, like the famous "devil dog" invention of a Marine Corps press agent. "Popsickle" is jargon—senseless gibberish, and "hitting the silk" can probably be classed the same—professional cant. "Homing device" and "flying the wet beam" would undoubtedly be called vernacular—language of a trade or calling.

The only true slang on your list are "rat race" and "little poison" and both date back to the Spanish-American war.

But that's only the warm-up. He reserves his fast ball for the statement that "G.I." means "government issue." "This is," he rants, "not only a synthetic abortion but a prostitution of a good cant expression. G.I. means 'galvanized iron' and was and is applied by the Army to common household ashcans and to them only."

Don't glower at us. All we did was to copy the list from *Army Ordnance*, and we still think it is very funny to call a mock battle a "G.I. war."

Damned Decimal Point

• • • And then S. E. (J. H. Day Co.) Hurdle balks at this statement in the Aug. 7 editorial:

Looking up the statistics on the American coast line and figuring that the average encroachment of the rising tide was about 100 ft. of beach, the youngster figured that tidal effects were depriving the American continent of some several hundred million square miles of territory that was under water about half of the time.

He says the area of the entire terrestrial globe is under 200 million square miles. Let's see—8,000 squared 64 million; times pi is about 200 million. The figure is right but it seems inadequate. We can remember when a million was a respectable sum. Now it seems like chickenfeed.

Put Them All Together They Spell . . .

• • • But the week's grist is not entirely acetic. A New England manufacturer soothes us with this:

"The Iron Age is a mother to the industry."

The old lady now has more children than at any other time in her life and her family continues to grow like grass in a gravel driveway.

Aptronyms

• • • Bill Toboldt, editor of our sister publication, *Motor Age*, says that Dr. A. H. Puls is a Philadelphia dentist and that an undertaker in the same city is happily named Delmer J. Colflesh.

His Adam's Apple Rumba'd

• • • National Carbon Co.'s R. L. Baldwin squawks because the photograph on page 86 of the Aug. 7 issue, showing Bell Aircraft's new Niagara Falls plant, is captioned "Bell's Buffalo Plant." "What's the matter," he asks rhetorically, "with Niagara Falls? After all, Buffalo is only a suburb."

The error was an honest one. We laid it hurriedly on the broad shoulders of Jim Rowan, your f.f.j.'s news and markets editor, who is responsible for the topshelf captions on the photographs and news items you see here. "S'elp me," sezze with tears in his eyes, "I had no intention of slighting Niagara Falls. I know that there is more to it than honeymoons and hydraulics." Fearing that in his remorse he might fall upon the old-fashioned sharp-pointed file on which he spears proofs, we covered the point with a large potato we carry for the purpose, and tiptoed out. We feel safe in assuring Mr. Baldwin that the error will never occur again.

Stopper

• • • When tanks were only tractors with tin hats—Hyatt.

Puzzles

The answer to last week's problem, at least one of the answers, is 142,857. You can multiply it by 2, 3, 4, 5, and 6 without disturbing the order of the digits.

Among the master minds who found this too easy for their mental muscles were F. E. (General Motors) Richter (three seconds flat), R. C. (Pyrites Co.) Trumbull, Peter P. Weldinger, A. W. (Youngstown Steel Tank Co.) Kelly and Lt. Com. A. R. Simpson.

Henry L. Setz, of the Navy Department's Bureau of Ships, apologizes for sending in a late answer to the July 24 problem. He says the delay was due to the fact that the copy he gets is routed among many readers. Any reader who asks for them can get free routing slips, specially printed for his firm's use. Write us at 100 E. 42nd St. Just send a list of readers.

Meanwhile, you can toy with this trifle sent in by the Lt. Com.:

A flagpole, 100 ft. high, stands immediately next to and touching a blockhouse, 10 ft. wide and 10 ft. high. The pole breaks, without separating from the main portion, and falls so that the broken portion just touches the edge of the blockhouse roof, and the tip just touches the ground. What is the height of the break above the ground?



SCALES help design airplanes? Yes, they help vitally! In wind tunnels where airplane designs are tested, scales are the instruments which give engineers the figures they need.

And that's just *one* of the unusual jobs modern Fairbanks Scales are doing for industry! For today there are scales which *count* small parts or products, weigh while materials are on the *move*, *print* records and receipts, *add up weights* and record totals, and weigh predetermined amounts *automatically*.

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DIESEL ENGINES ELECTRICAL MACHINERY RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS MOTORS WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

This Industrial Week . . .

THREE men in a boat gave the past week what seemed to be a special place in history. The boat, no tub, was the crack British battleship H.M.S. Prince of Wales. The men were the President of the United States, Prime Minister Churchill and Lord Beaverbrook, British Minister of Supply.

In this atmosphere of great events, in which the affairs of this country and much of the world were being planned

Who for Industry?

for a long time to come, U. S. industrialists, large and small, were not too preoccupied to look for a fourth man in the boat, a representative of U. S. industry. Behind Prime Minister Churchill—so close that he almost trod on the Prime Minister's heels as Churchill nimbly clambered up the side of the American cruiser Augusta—was the Canadian-born Max Aitken, Lord Beaverbrook, a business man who in England is closely identified, because of his position and organizing ability, with war materials' production.

Admiral for admiral, general for general, uniform for uniform, cigaret holder for cigar, the Americans in this historic conference on the vasty deep somewhere off the coast of Maine matched the British. There was one exception. No one matched Beaverbrook, although the ultimate decision in the newest World War rests upon the productive capacity of the American metal-working industry to meet the gnawing hunger of at least four large nations, Britain, China, Russia and the U. S., for tanks, guns, planes, ships and other equipment for war.

On land, where newswriters could readily find them in meetings held without ceremony, without pea jackets and 15-in. guns, production leaders who might have replaced certain deadhead passengers at the Atlantic conference struggled to meet new problems and old problems steadily growing more menacing. To check the shutdowns in small metal working plants un-

No Pea Jackets

able to obtain material because of priorities placing defense requirements is late in coming. It isn't director of the Office of Production Management, advised the Army and Navy and other government buyers to break up their contracts



TAKEN OVER: L. H. Korndorff (above), is president of the Federal Shipbuilding & Dry Dock Co., U. S. Steel Corp. subsidiary which owns the Kearny, N. J., shipyard, expected at midweek to be taken over by the Navy Department. Two weeks ago CIO union strikers closed the yards when the company refused to dismiss employees not in good standing with the union.

so that small plants could handle them, to accept a pool of small manufacturers as a source with which prime contracts can be placed to use negotiated contracts, to give bonuses for early deliveries if such deliveries can be speeded by subcontracting. This sounds like good sense and it would be incorrect to say that Knudsen's advice to the government departments is late in coming. It isn't

Advice for the Army

late. It has merely been expressed again. With a new leasehold bill estimated at \$10 billions in the offing, with British leaders privately dissatisfied with the flow of war materials from the United States, with the Soviet asking for quantities of war material staggering in volume, the steel and metal-working industries face new tasks.

One step which may be taken to meet the swelling defense production burden may be forced subcontracting covering both private industry and the Army and Navy. "The only way in which a better economic balance can be struck in production in this country," says Mr. Knudsen, "is to speed up the placing of more subcontracts . . . to act as a shock absorber to the rough roads of priorities and material shortages. One school says

Forced Subcontracting

shut down. The other school says let it down gradually while you are building up defense and you will have less displacement of facilities and men." Knudsen, who has been on an extraordinary tour of defense plants, remarked last week that by the summer of 1942 the U. S. can write its own ticket on war materials. For some small companies the question is: "Can we live until next summer?"

More study of the steel priority order by steel consumers and producers brings home the fact that most non-defense orders for steel cannot be filled for some time to come. Mills are awaiting official word that they can use their own experience and discretion where necessary in determining the proper sequence of steel orders so that rolling mill schedules will not be upset and production actually lost. Steel mills which roll on certain

sizes and types of steel for long periods before switching to another size or type are concerned with the likelihood of increasing costs as well as slower production. Large consumer industry groups, such as canners, railroads, the oil industry, and jobbers are growing still more

Effects of Shortages

apprehensive over their ability to obtain the necessary steel. Refrigerator and washing machine makers, grave vault manufacturers and makers of such items as stoves, signs, bird cages and bed springs, as well as countless other industries hitherto served fairly promptly by steel producers are scheduled for a period of low operations.

To prepare for increased steel capacity, OPM Director of Production John D. Biggers this week urged the Maritime Commission to build 25 ore boats. According to the Lake Superior Iron Ore Association, ore consumption in July set an all-time peak at 6,497,442 gross tons, a gain of around 268,000 tons over June.

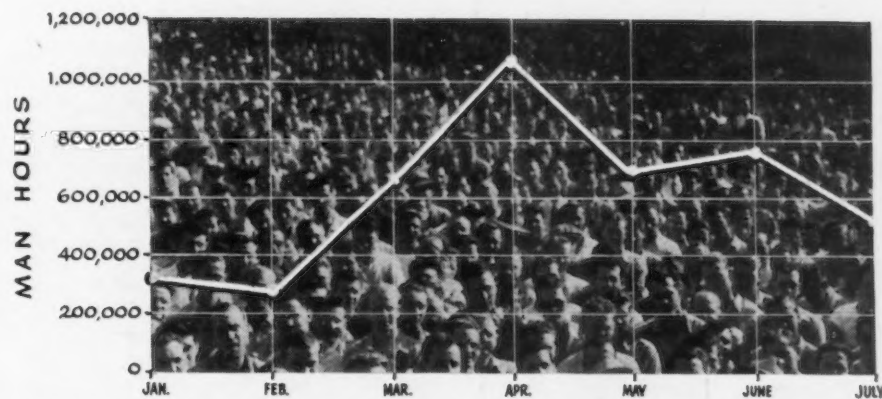
The OPM, it is understood, is studying a proposal to build a complete steel plant at Hammond, Ind., on land owned by Jones & Laughlin Steel Corp., the plant to include two or three blast furnaces, Bessemer converters and facilities for making shells and other products at a cost exceeding \$125 millions.

For another week steel orders have exceeded the industry's capacity to produce with greatest pressure being, in this order, on (1) semi-finished steel, (2) bar mill products and (3) plates. Soon to be handled are British requirements for another million tons of steel for delivery by early spring.

Meanwhile industry's all-out effort to mass its strength for national defense is somewhat less

No Korny Kontract

than helped by building of the Federal Shipyard & Drydock strike at Kearny, N. J., into a full dress test of a union's right to force management to dismiss a union member who has not paid his dues and is in bad (union) standing. In industrial areas far from New Jersey, among managers of plants and of unions everywhere,



DEFENSE TIME LOSSES: Man days of work lost in the first seven months of 1941 in strike-afflicted defense plants totaled 4,358,000, the National Association of Manufacturers reports. Totals by months, reflected in this graph, are June, 357,000; February, 301,579; March, 649,213; April, 1,071,380; May, 685,770; June, 757,047, and July, 536,611.

the Kearny strike deserves more attention than it is getting.

In Kearny, the CIO is making its latest bid for immortality, the closed shop, to the United States Steel Corp., which in 1937 broke a 50-year tradition by signing a collective bargaining contract with the SWOC, a CIO affiliate. Union pickets this week carried banners telling L. H. Korndaf, Federal Shipbuilding President, we want "No Korny Contract."

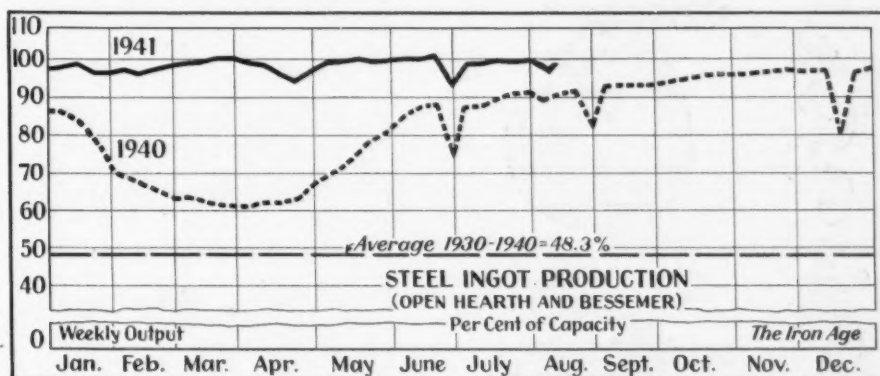
This week's production level in the steel industry rose a half point to 99.5 per cent from last week's 99 per cent rate as a result of minor changes, including a point and half gain at Chicago to 101½ per cent and a four point advance at Cleveland to 97 per cent. Wheel-

ing Steel Corp.'s Portsmouth, Ohio, plant still reports being able to operate only eight open-hearth furnaces due to lack of scrap.

With the OPACS price ceiling to all effects mere scraps of paper, the scrap trade this week is expecting steps in either of two directions. That of licensing brokers or the establishment of priorities. In any event OPACS is unlikely to take any drastic steps toward enforcement of its ceiling until the price control bill now before Congress is passed. This bill will give OPACS the required teeth to enforce its orders.

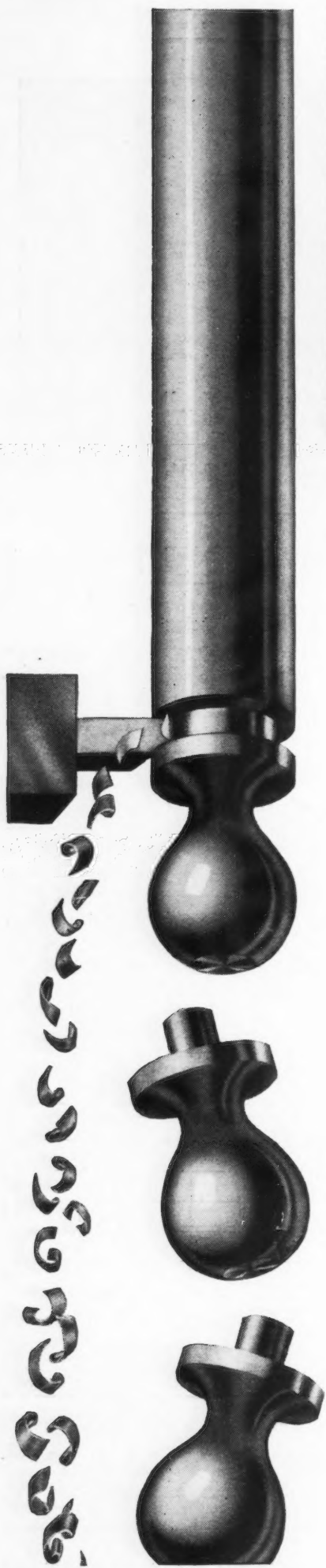
Scrap Priorities

Steel Ingot Rate Gains ½ Point to 99.5%



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts- burgh	Chi- cago	Val- leys	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	South- ern	S. Ohio River	West- ern	St. Louis	East- ern	Aggre- gate
Current Week	100.0	101.5	99.0	93.5	97.0	106.0	91.0	104.5	95.0	102.0	102.5	111.0	101.0	99.5
Previous Week	100.0	100.0	99.0	97.5	93.0	104.5	91.0	104.5	95.0	98.0	102.5	111.0	98.5	99.0



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News of Industry



IT MUST BE DONE:
When this photograph was taken, President Roosevelt and Prime Minister Churchill were aboard the H.M.S. Prince of Wales in their historic "peace and war aims" meeting at sea. Among these aims undoubtedly was still higher arms products from U. S.

Forced Subletting Is Seen Likely as New OPM Drive Opens

••• Faced with the new problem of supplying Russia with war equipment, in addition to meeting the sharply increased schedule of shipments to Britain as laid down by Lord Beaverbrook's new blueprint, worried defense officials are opening a new drive for wider subcontracting on defense work.

Already facing a difficult problem in meeting delivery schedules on some work previously let, they are confronted by prospects that a new lend-lease program, amounting to as much as \$10 billion, will soon be dumped in their laps.

Last week, high ranking defense officials expressed the belief that greater subcontracting holds the answer to the problem of providing armament quickly to Britain, Russia, China and the U. S.

New plant facilities underway or planned will, according to present plans, enable the Democracies to match the Axis output, but until such time as all these new facilities are in operation, defense of-

ficials are placing their hopes in subcontracting.

The possibility that teeth might be put into the drive for subcontracting if voluntary efforts were not successful, was voiced by Charles Poletti, Lieut. Governor of New York, at a Defense Production Clinic at Brooklyn, last week. "Unless prime contractors receiving large defense orders accelerate the letting of some of the work to smaller shop units, the government should write a clause in future contracts making such division mandatory," he said.

Without denying the important progress that has been made in the national defense program thus far and the present wide use of subcontractors, especially by the aircraft and automobile-bomber plants, the fact remains that some defense authorities feel that the "little fellow" is not participating as much as he should. Moreover, some defense officials indicate the belief that defense output could be speeded further if the practice of subletting were expanded, aside from the desire to spread defense work as widely as possible to provide a shock absorber against the cutting off of normal civilian goods manufacture.

Imposition of mandatory subcontracting rules upon recipients of defense orders was closer to realization last week, when the OPM granted its Defense Contract Service new and wider powers and announced, on Aug. 16, tentative plans which included the possible re-examination of long-term defense contracts to consider spreading the work and speeding its completion. Some such action had been expected in view of official concern over the lack of complete success in previous subcontracting drives.

On Aug. 16, the Defense Contract Service was made an autonomous unit in the OPM, and in cases of "priorities unemployment" was empowered to recommend to the Secretary of War and the Secretary of the Navy such remedial action as: (1) negotiated contracts by the armed services at a permissible cost up to 15 per cent above the previous similar contract, in place of competitive bidding; (2) placing of trial orders on a cost-plus basis; (3) placing of contracts with cooperative groups of a given community or industry; (4) elimination of bid or performance bonds when necessary; (5) provision for in-



Photo by Wide World

SHOW FOR SUBCONTRACTOR: An exposition of engine parts has been opened at the OPM's Detroit branch to aid small manufacturers in determining what they can produce in defense parts. Actual parts are on display. Above are Joseph L. Trecker, co-chief of OPM's sub-contracting unit at Washington; Gov. Murray Van Wagoner of Michigan, and E. P. Gallagher, Continental Motors director of purchases.

spection of products at the plant to facilitate prompt payment, and (6) elimination of "latent defect" clauses in contracts to end contingent liability.

The OPM's new program to spread subcontracting, in order to ease the impact of the defense program upon the consumer goods industries, includes plans to forbid deliveries or refuse priorities on new machine tools if subcontracting facilities are available within a reasonable distance. A proposal that on contracts of over \$250,000 a specific percentage of the work may be designated for subcontracting where possible, and the re-examination of contracts for supplies scheduled for delivery after Dec. 31, 1941, for possible subcontracting and the offering of bonuses to speed up deliveries, was also authorized.

A dramatic indication of the disappointment in past subcontracting drives was the admission of the bogging down of such attempts in Michigan by Governor Van Wagoner, and the statement of Warren H. Clarke, of the Detroit Defense Contract Service Office that the difficulties were due

to "lack of enough prime contracts to enable automobile manufacturers to plan an intelligent long-range program; alleged failure of small contractors to seek defense contracts because their civilian production still is proceeding almost normally, and apparent failure of large manufacturers to let subcontracts.

Meanwhile the Automobile Manufacturers Association disclosed that the industry would farm out subcontracts for about 45 per cent of its \$2,000,000,000 in defense contracts, and that some orders have already been allotted to plants in 21 states for everything from forgings and stampings for 31-ton tanks, to screws and wood plugs for liquid-cooled airplane engines.

Prior to the OPM's latest moves, the Defense Contract Service was trying to increase subcontracting by sponsoring Defense Clinics to bring together at informal meetings representatives of prime contractors and small shop owners seeking subcontracts. Thus far, these clinics have been instrumental in concluding several hundred subcontracts, and more impressive

results are expected by the National Clinic to be held Sept. 22 to 24 at the Grand Central Palace, New York.

Since attendance at the September National Defense Clinic will be scheduled to avoid overcrowding at the opening, small shop owners are being asked to register in advance by mail at the Defense Contract Service, 33 Liberty St., New York. The Defense Contract Service has 36 regional offices in each Federal Reserve Bank and in the various branches to offer technical advice and obtain financial assistance for defense contractors or subcontractors.



Seek Engine Subcontractors

Detroit

••• An exhibit of parts of the Wright Whirlwind 400 hp. nine-cylinder radial air-cooled airplane engine was opened to manufacturers on Monday of this week (August 18) by the Defense Contract Service of OPM, in the Federal Reserve Building, 160 W. Fort Street, Detroit. Subcontractors to do work on a large variety of these precision parts are being sought through this means.

It was explained by Warren H. Clarke, Detroit district manager, that all of the parts of this engine are now being manufactured by Continental, which is in production and delivering these for use in training planes and for the medium tank being built for the Army by Chrysler Corp.

Continental engineers and buyers have been designated by C. J. Reese, president of Continental Motors Corp., to be present at the exhibit with members of the Defense Contract Service staff to go over blueprints and specifications with potential subcontractors and offer them assistance in preparing their bids. Subcontract negotiations will be carried on direct between Continental and those manufacturers who show that they can produce the parts exhibited.

Work to be subcontracted includes the machining of aluminum castings, steel forgings, cylinder barrels, cylinder heads, crankshafts, connecting rods (both master and articulated) crankcases, a large number of small gears and miscellaneous small parts. All

OPM Issues Call for More Screw Machines

Detroit

• • • The Defense Contract Service of OPM in Detroit has asked THE IRON AGE to publish the following urgent notice:

"All firms and individuals having automatic screw machines, with secondary operations equipment, that are not working to capacity 16 to 24 hr. per day on government work, are requested to get in touch with the Defense Contract Service, 160 W. Fort St., Detroit, or call Cadillac 6880, L. E. Walker, chief engineer. These machines are urgently needed to speed up deliveries of materials to the armed forces for national defense."

castings, forgings and raw stock will be furnished by Continental.

It has been emphasized by engineers concerned in the production of the Continental engine that the precision work required is no more exacting than that usually associated with automotive work. Tolerances vary, but in some cases are as great as 0.002 in. Surface finish must meet a high standard, however.

Asked what type of manufacturing plant might logically expect to handle such subcontracts, one of the engineers named a list that included manufacturers of gasoline fuel pumps, refrigerators, washing machines, printing presses, compressors, and gear manufacturers, and others doing similar quality work.

Non-Metallic Mineral Committee Set Up By OPM

Washington

• • • A special technical advisory committee on non-metallic minerals has been appointed by the OPM priorities division as a special sub-committee of the Advisory Committee on Metals and Minerals. The latter committee was appointed by the National Academy of Sciences.

The new committee, whose members are preparing reports on graphite, mica, asbestos and other strategic minerals, includes the following members:

R. P. Heuer, chairman, General Re-

fractories Co., Philadelphia; Paul Tyler, secretary, U. S. Bureau of Mines, Washington, D. C.; L. E. Barringer, General Electric Co., Schenectady; B. C. Burgess, United Feldspar & Minerals Corp., Spruce Pine, N. C.; W. S. Landis, American Cyanamid Co., New York; G. R. Mansfield, U. S. Geological Survey, Washington, D. C.; Robert B. Sosman, United States Steel Corp., Kearny, N. J.

John D. Sullivan, Battelle Memorial Institute, Columbus, Ohio; Frank J. Tone, Carborundum Co., Niagara Falls, N. Y.; William M. Weigel, Missouri Pacific Railroad Co., St. Louis; M. M. Leighton, State Geological Survey Division, Urbana, Ill.; G. A. Bole, Orton Ceramic Foundation, Columbus, Ohio; R. B. Wittenberg, International Agriculture Corp., New York, and Oliver C. Ralston, U. S. Bureau of Mines, College, Park, Md.

Membership of other special sub-groups of the Advisory Committee on Metals and Minerals previously had been announced for other metals and minerals.

Beech Corp. and Vultee Get \$27 Million Aircraft Orders

• • • Vultee Aircraft, Inc., Downey, Cal., has received an order amounting to \$14,518,707, and Beech Aircraft Corp., Wichita, Kans., one of \$12,610,125, for airplanes and spare parts. The two contracts, issued by the War Department, were approved by the Office of Production Management.

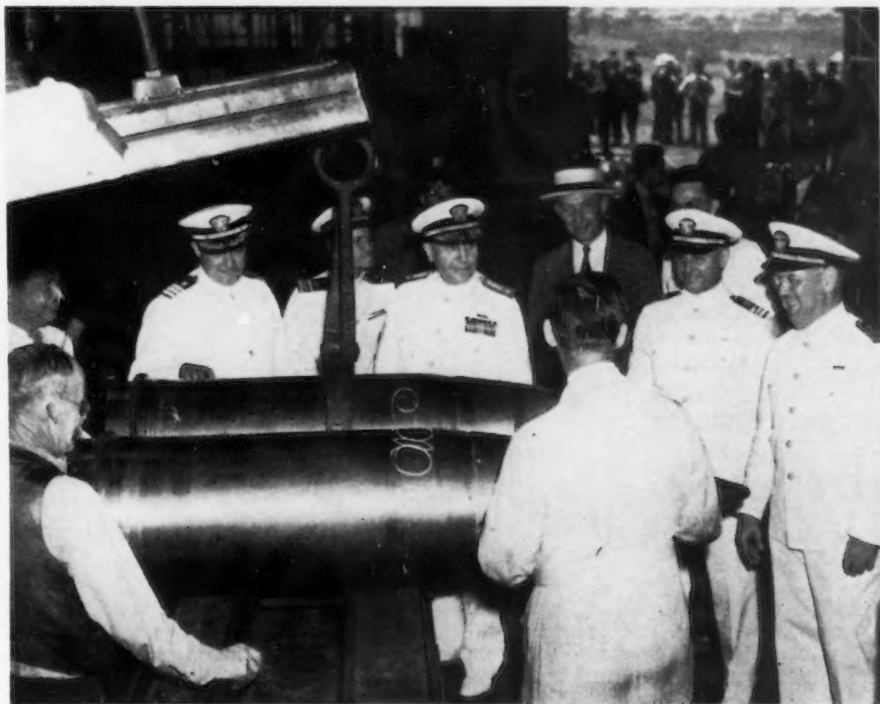
Shell Case Work Progresses, Fork & Hoe Officials Say

• • • Development work on steel shell cases has been highly successful, according to officials of American Fork & Hoe Co. here. Problems of rust prevention and cost are about the only foremost problems requiring additional attention. By first heating and drop forging the base section of the shell case, and then cold drawing the body of the shell afterward, damaging strains have been surmounted.

In September, 1940, the company started experimental work on the use of steel for cases, at the behest of Canadian authorities. A. F. Fifield, president of the company, had operated a Canadian factory producing brass cases during the World War. Within a few months Canadian officials expressed satisfaction with the test cases which had been made. Durability was high and repairs were low. American authorities then became interested. Alloy steel is employed. Test lots in both the 40 mm. anti-aircraft and 105 mm. howitzer sizes have been completed and are to be tested soon.

BETHLEHEM SHELLS: Without Bethlehem Steel Co.'s capacity for making war products the national defense program would be greatly handicapped. Shown here in an inspection of 16-in. armor-piercing shells at the company's Bethlehem, Pa., plant are Rear Admiral Clark H. Woodward (third from left in navy uniform) and other naval officers.

Press Association Photo



OPM Asks Data From 225 Steel Companies

Washington

• • • Price Administrator Leon Henderson last week gave members of the steel industry the alternative of filling out a 15-page statistical data sheet by Sept. 2 or run the risk of delaying any OPACS adjustment in ceiling prices fixed for iron and steel products.

While Mr. Henderson said he was seeking "only such data as should be readily available" from records covering the year 1940 and the first two quarters of 1941, he also appealed to the patriotism of steel companies, expressing the hope that they will regard completion of the forms as part of the defense program.

The questionnaire, which was mailed to 225 members of the industry on Aug. 15, includes questions on:

(1) Consolidated profit and loss statement; (2) purchases, production and sales; (3) wages, salaries, man-hours, employment and major wage and salary rate changes; (4) consolidated balance sheets, and (5) historical data as to production, profits, etc., from

1936 through 1940 and for the first two quarters of the current year.

To provide OPACS with an overall picture of the industry and an insight into the operations and financial results of individual companies, Mr. Henderson asked for data on steel production by tonnage and forms, raw material consumption, income and expense accounts, and the financial position and payrolls from each producer. He promised that the information will be used by defense agencies only and that the identities of individual producers will not be revealed.

Shortly after he was named OPACS administrator, Mr. Henderson issued an order freezing steel prices at their March 31 level. This action was taken on April 17, when Mr. Henderson left the door open for members of the industry to submit statistical proof that the frozen price level works a hardship in view of higher labor and raw material costs.

It was also announced at the time that OPACS was undertaking a study of prices and costs in the steel industry, Mr. Henderson promising that "adjustments in the schedule will be made if these studies indicate that they are necessary."

In mailing the questionnaire

Material Priorities Hit 200 Ohio Plants

Youngstown

• • • Operations of the OPM in Ohio will be expanded and a branch office may be located here, according to H. C. Atkinson, administrator of the State Bureau of Unemployment Compensation and member of the Interim State Defense Council.

Atkinson is concerned seriously over the problem of providing defense contracts for smaller factories to prevent a threatened lay-off of possibly 200,000 Ohio workers.

"A very serious situation has developed in the last few weeks," he said. "In no less than 200 or 250 cases Ohio plants have either shut down or curtailed production sharply because of priorities on manufacturing materials. While a majority of the workers undoubtedly will find other jobs, there may be time lost in the transition."

last Friday, Mr. Henderson wrote steel companies:

"Return of the questionnaire not later than Sept. 2, 1941, will place OPACS in a position to proceed promptly with its study."

High Priorities Speed Production of Tanks

• • • Three government arsenals and eleven private plants, all unidentified, have been given priorities ratings of A-1-d for their medium tank requirements, and A-1-f for light tank production. The action, taken to expedite production of the vehicles, will make the ratings available to the suppliers and sub-contractors and simplify the acquisition of essential materials including motors, guns and other equipment.

The OPM priorities division said that the ratings were made necessary by a greatly accelerated production schedule which doubles previous estimates of tanks to be completed by mid-1942.

Army Orders Mouth Gags

• • • The Army Medical Department has ordered \$4,795 worth of mouth gags from J. Sklar Mfg. Co., Long Island City, N. Y., according to the War Department's list of awards announced.

PD-69 DUPLICATE

OFFICE OF PRODUCTION MANAGEMENT
IRON AND STEEL BRANCH
WASHINGTON, D. C.

CUSTOMER'S PIG IRON ORDER FOR SHIPMENT
DURING MONTH OF _____, 194__

(See attached instructions before filling out form)

NOTE.—Producers' monthly shipment schedules are confined to orders placed with the producers on or before the fifth day of the month preceding the month during which shipment is required.

To _____ <small>(Name of producer)</small> _____ <small>(Producer's address)</small>	From _____ <small>(Name of customer)</small> <small>(Date of order)</small> _____ <small>(Customer's address)</small> <small>(Customer's order number)</small> _____ <small>(Plant in which iron will be used)</small>
---	---

PREFERENCE RATINGS (1)	GRADE OF PIG IRON (2)	QUANTITY IN GROSS TONS (3)	ULTIMATE USE (4)

PIG IRON FORM: OPM form PD-69, which all pig iron users must fill out once a month, is another addition to the flood of government reports engulfing the iron and steel industry. Many plants have set up departments solely for the handling of government reports.

Vanadium Put Under Full Priority Control

Washington

••• An OPM order subjecting vanadium to full priority control assigns an A-10 rating for defense orders not previously given a rating, requires the acceptance of defense orders in preference to non-defense orders, and stipulates that after Sept. 1 a manufacturer in the market for vanadium must file not later than the 25th of the month preceding the month specified for delivery, a statement indicating the use to which it is to be put.

The order, which became effective Aug. 14, restricts deliveries to an amount not in excess of that necessary to a manufacturer to fill his orders on the basis of his current method and rate of production, but this restriction is not applicable to export licenses or to vanadium imported by a processor. Simultaneously with the issuance of the order, vanadium was removed from the inventory control provided by General Metals Order No. 1.

OPM experts placed the 1940 domestic consumption of vanadium at approximately 3,000,000 lb., estimating that, based on the current rate of production, 3,750,000 lb. in finished form will be available in 1941 as compared to an estimated need of 5,900,000 lb. for the year. Requirements for 1942 are expected by OPM to reach 7,150,000 lb. The United States and Peru produce about equal quantities and supply 70 per cent of the world's demand for vanadium.

OPM Appoints MacPherson Assistant Purchasing Director

Washington

••• James MacPherson, secretary-treasurer of the California-Arabia Standard Oil Co., San Francisco, has been named assistant director of purchases, equipment and supplies branch, OPM purchasing division. Designated by Director of Purchases Donald M. Nelson, Mr. MacPherson replaces Donald G. Clark, who was recently assigned to the Army as procurement consultant.

THIS WEEK'S

Priorities and Prices

- (OPACS)—Questionnaires were mailed to 225 steel companies on Aug. 15 to obtain financial and production data. Information will be used as guide in making any necessary adjustments in ceiling prices on steel.
- (OPM)—Pig iron producers ordered to set aside 2 per cent of September output for emergency use. The pool will amount to between 90,000 and 100,000 tons.
- (OPM)—Iron and steel products, aluminum scrap, ferro-tungsten, ferro-chromium and calcium silicon removed from inventory control exercised by General Metals Order No. 1. Control is now exercised by priorities now in effect on these items.
- (OPACS)—Fear over possible interruption of shipments of tin from Far East caused establishment on Aug. 15 of ceiling price of 52c. a lb. for grade A metal.
- (OPM)—Three government arsenals and 11 private manufacturers making tanks assigned preference ratings of A-1-D for medium tanks and A-1-F for light tanks in move to expedite output of these items. Ratings extend to suppliers and sub-contractors.
- (OPM)—Appointment of special staffs to handle priority matters suggested to manufacturers. OPM offers to hold training course for such specialists.
- (OPM)—Steps are being taken to salvage 232,000 tons of rails in abandoned street car and railroad tracks, the Transportation Division reports. Railroads also asked to scrap all unused bridges, cars, buildings, etc., as rapidly as possible.
- (OPM)—Capacity for finishing aircraft and other alloy steels will have to be doubled, it was reported after a meeting of defense officials and steel company executives. Tubing was specifically mentioned.
- (OPACS)—Reduction in prices of burlap bags is expected due to setting of a ceiling on burlap about 20 per cent below recent spot market quotations.
- (OPM)—Fifteen major defense firms and 15 labor leaders were scheduled to meet Aug. 19 in Philadelphia to study problem of providing work for employees in plants whose operation has been curtailed by defense priorities.
- (OPACS)—Lower mercury prices predicted soon due to larger supplies now available to civilian users. Present prices are out of line, the price agency claims.
- (OPM)—Special technical committee on non-metallic minerals appointed to advise OPM. Committee is now preparing reports on graphite, mica, asbestos and other strategic minerals.
- (OPM)—Eighteen automobile manufacturers invited to attend a Washington meeting today (Aug. 21) to discuss future automobile production.
- (OPACS)—Lead scrap prices described as "ridiculously high," and unless voluntarily reduced will be brought down by imposition of ceilings. Some hoarding is taking place, it was also charged.
- (OPM)—Maximum prices for various grades of copper scrap established on Aug. 18, in Price Schedule No. 20.
- (OPM)—Construction of an emergency Great Lakes fleet of 25 iron ore vessels at an estimated cost of \$50,000,000 recommended to Maritime Commission. Ships will be needed to take care of planned expansions in pig iron capacity.
- (OPACS)—Prices of Southern pine lumber reduced about \$3 per thousand feet from recent levels in price Schedule No. 19, announced Aug. 16.
- (OPM)—Revised edition of Priorities Critical List issued. New listing is broken down into finished products and raw materials.
- (OPM)—Vanadium placed under full priority control on Aug. 16. Monthly reports must be filed showing uses, inventory, etc.
- (OPACS)—Amendments to aluminum scrap and secondary aluminum price schedule announced on Aug. 16. Chief change respects fees charged by converters.

OPM Shooting for Capacity Increase of 12,000,000 Tons

Washington

••• An expansion program calling for a 12,000,000-ton increase in the steel industry's annual ingot capacity was forecast this week as a result of an OPM report and recommendation prepared for White House approval. The 12,000,000-ton figure is understood to be subject to upward adjustment as additional expansion proposals are submitted by several steel companies, but OPM steel experts appear to be shooting for an approximate 12,000,000 tons.

This figure represents a 2,000,000-ton increase over the 10,000,000-ton expansion previously proposed, but is 3,000,000 tons below the 15,000,000-ton figure known to have been under discussion.

The second Gano Dunn steel report estimated that a 10,000,000-ton expansion would require 4,160,000 tons of steel for construction and equipment. On this same basis, a 12,000,000-ton increase would call for 4,992,000 tons of steel.

Also believed subject to future changes is the proportion of bes-

semer, open hearth and electric furnace expansion recommended by the OPM. The percentage of bessemer capacity involved in the expansion program under study for several months has increased of late because of a shortage of scrap and the desire of government steel experts to encourage an increase in bessemer capacity as a means of maintaining and increasing steel production despite the scrap shortage.

The proportion of electric furnace capacity for producing alloy steel also is expected to be subject to upward revision over earlier estimates. When the OPM steel unit reviewed steel industry proposals last week for expanding ingot capacity by 12,000,000 tons, the various companies were told that their proposals did not include sufficient facilities for producing alloy steel to meet all prospective requirements, particularly those for aircraft, military vehicles and other phases of the defense program. Before makers of alloy steels are asked to submit further expansion programs, OPM hopes to have access to a report being prepared by H. LeRoy Whitney, OPM alloy steel consultant. Sept. 1 has been fixed as a likely date for the completion of this report and its consideration by the steel units' executive committee.

Canadian Government Names Steel Board

••• C. D. Howe, Canadian Minister of Munitions and Supply, last week announced formation of a Wartime Steel Advisory Committee, to guide the Steel Controller in working out "a radical readjustment of the steel supply situation from Canadian sources," with the purpose of protecting the Dominion's munitions industry's requirements and apportioning surplus steel among domestic users.

Members of the committee are: T. M. Hutchison, president, Drummond, McCall & Co., Ltd., Montreal; H. G. Hilton, vice-president, Steel Co. of Canada, Ltd., Hamilton, Ont.; C. B. Lang, vice-president, Dominion Steel & Coal Corp., Ltd., Montreal; T. F. Rahilly, vice-president and general manager, Algoma Steel Corp., Ltd., Sault Ste. Marie; and Frank A. Sherman, vice-president and general manager, Dominion Foundries & Steel, Ltd., Hamilton, Ont.

Expanding capacity for finishing and treating alloy steels, a major part of the study undertaken by Mr. Whitney, was the subject of discussion at an informal meeting on Aug. 12 between industry and government representatives. OPM steel experts estimated after the session that alloy steel finishing capacity probably would have to be doubled to meet the requirements of the defense and lend-lease programs.

On the OPM proposal to air condition blast furnaces as a means of increasing pig iron production, the OPM steel unit has received word that such equipment will be installed at furnaces operated by the Great Lakes Steel Corp., Detroit; Inland Steel Co., Chicago; Jones & Laughlin Steel Co., Pittsburgh; and Bethlehem Steel Co., Sparrows Point, Md.

While OPM is understood to have encountered skepticism by Northern mills as a result of the air conditioning proposal, officials expect that blast furnaces in the Birmingham, Ala., area will be air conditioned rather generally, atmospheric conditions in that section making such a step clearly advisable. The installation at the Great Lakes Steel Corp., regarded more in the nature of an experiment, and the other blast furnaces

LAND CRUISERS: Here is one of the first photographs of Britain's new 18-ton tank now being turned out by the thousands at a Midland factory.

Photo by British-Combine



to be air conditioned in Northern mills, are not expected to increase materially the pig iron output of these furnaces, but OPM steel advisers are proceeding on the theory that "every little bit helps" to relieve the existing shortage.

Air conditioning, by reducing and controlling the moisture content of air blown through the blast furnace, has increased pig iron production of some furnaces in the Birmingham area an average of 7 per cent or more a year. Results from scattered installations in the North have varied widely, and both OPM and the industry regard additional experimentation as desirable.

In attendance at the Aug. 12 meeting, at which steel expansion was the major topic up for consideration, were the following members of the industry:

Quincy Bent, vice-president, Bethlehem Steel Co., Bethlehem, Pa.; H. A. Berg, president, Woodward Iron Co., Woodward, Ala.; W. B. Gillies, vice-president, Youngstown Sheet & Tube Co., Youngstown, Ohio; J. E. Lose, vice-president, Carnegie-Illinois Steel Corp., Pittsburgh; F. B. Lounsbury, vice-president, Allegheny Ludlum Steel Corp., Watervliet, N. Y.; G. E. Rose, president, Wisconsin Steel Co., Chicago; Wilfred Sykes, president, Inland Steel Co., Chicago; C. M. White, vice-president, Republic Steel Corp., Cleveland; and Willard S. Haring, vice-president, Alan Wood Steel Co., Conshohocken, Pa.

Britain Strike-Free, Economist Editor Says

Chicago

• • • Freedom from strikes marks England's war effort in World War II, Geoffrey Crowther, editor of *The Economist*, of London, told the Chicago Council on Foreign Relations. In the first World War, England's production was marred by frequent labor stoppages and disputes. "But during this war there have been no strikes at all that have threatened an interruption of defense production—and no lockouts," Crowther stated.

The editor asserted that neither management nor labor had made concerted efforts to gain special benefits for either side.

"Real Strike" Threatened By Curtiss-Wright Union

• • • Propeller-Craft, Inc., independent union which recently won a National Labor Relations Board election at the Caldwell and Clifton, N. J., plants of Curtiss-Wright Corp., threatened last week to call a "real strike" if the International Association of Machinists (AFL) is recognized as a bargaining agent at the plants. Protests against the election and demands for higher wages made by the Machinists' union, which on Aug. 14 terminated by temporary truce a week-old strike, are being weighed by the National Defense Mediation Board. The truce was called at the request of the board and the OPM, and after company officials had promised to keep previous pledges against worker discrimination.

Lord Weir Resigns from British Supply Ministry

London

• • • Following the resignation of Sir Andrew Duncan as Minister of Supply (see *THE IRON AGE* of Aug. 14, page 92A) Lord Weir, Sir Andrew's personal adviser on industrial matters, has also resigned from the Ministry. Lord Weir, like Sir Andrew, was formerly chairman of the British Iron and Steel Federation.

NLRB Disestablishes Two Bethlehem Employee Groups

Washington

• • • The National Labor Relations Board has directed the disestablishment of two organizations of employees at the Pottstown, Pa., plant of Bethlehem Steel Co. on the ground that their administration was "dominated" by the company.

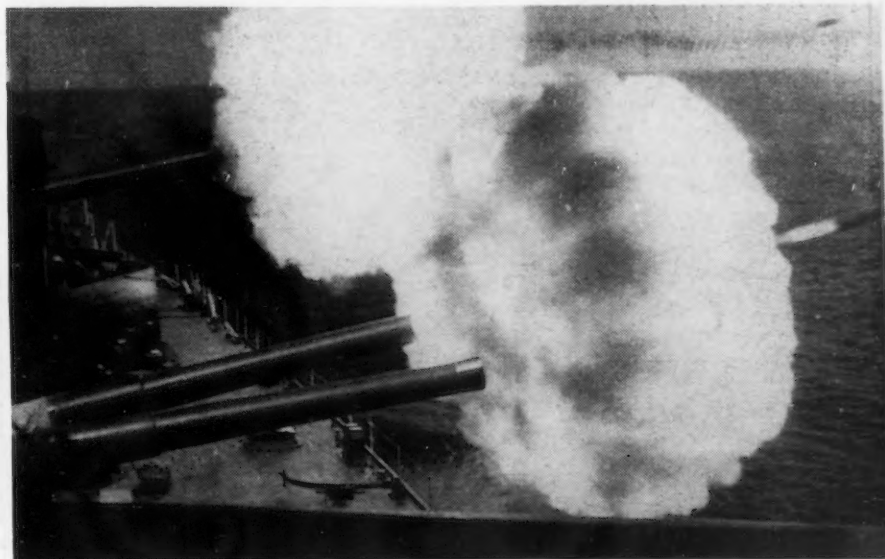
Affected were the Plan of Employees' Representation, and the Independent Steel Workers Association. The labor board also ordered the company to "cease and desist from interfering" with any other labor organizations.

Stalin Automobile Plant Undamaged, Works 3 Shifts

• • • Foreign correspondents, permitted by Russian officials to tour the Stalin automobile factory last week to refute German contentions that the Nazi air force had destroyed the plant, found the huge Moscow industrial landmark undamaged by raiders and turning out even more than the regular peacetime production of trucks and cars. Three shifts work 24 hr. daily in the die-stamping, motor-building and tooling plants and on the efficient assembly line, modeled after Detroit's best, according to newspaper dispatches.

SHELLS IN FLIGHT: This unusual photograph, showing 13.5 in. guns at the moment of discharge, was taken on a British battleship.

Photo by British-Combine



Henderson Fights For One Man Price Control Authority

Washington

• • • Retention of the "price leadership principle" and the basing point system under the OPACS order fixing ceiling prices on iron and steel were cited by Price Administrator Leon Henderson last week in substantiation of his claim that he has no plans to design a new distributing system for American industry.

Continuing his testimony before the House Banking and Currency Committee, Mr. Henderson asserted that, although as a government economist he had criticized both price leadership and the basing point system in the steel industry, the OPACS price freezing order seeks to preserve these principles. He told the committee that he construed his job to be the preservation of price stability and not to change "inequities" or attempt to drastically revise existing business policies.

The Henderson remarks were prompted by queries from representative Jesse P. Wolcott, Repub-

lican of Michigan, who asked whether price controls contemplated under the pending price fixing bill would "destroy the free enterprise system." The price administrator replied he wanted to see as many markets kept open as possible, forecast that speculation would be disrupted in a controlled market, and added: "But I do not think that price control will destroy free enterprise. It was not destroyed in the last war but only temporarily suspended."

During his testimony, Mr. Henderson defended himself against proposals to vest price control powers in a five-man board after Mr. Wolcott declared that to continue the existing set-up would "put the economic destiny of 130,000,000 persons in the hands of one individual."

Emphasizing that "for emergency problems you've got to have prompt action," Mr. Henderson's answer was that a board would be less effective than one man in meeting the challenge of "very, very fast moving prices."

Throughout his eight-day appearance before the committee, the OPACS head gave guarded answers when committee members sought his reaction to the bill's

failure to include a wage-freezing provision. Among other things, he suggested that future wage increases would depend on how quickly Congress acts on the pending bill.

Mr. Henderson described as "inescapable" a "legitimate demand" for wage increases in many industries "if we allow things to go on as at present."

He was also questioned on the farm pricing loophole, under which the price of farm products would be permitted to rise to 110 per cent of parity before being subjected to the bill's jurisdiction.

"It's not the price administrator's job to balance a scale of justice and equity," Mr. Henderson replied. "I don't think that's the purpose of the legislation before us. Its purpose is to prevent inflationary tendencies."

8000 Workers Idle in Aluminum Industry

Cleveland

• • • Mechanical and geographical problems in connection with obtaining more aircraft parts making subcontracts for the 26 companies of the Aluminum Wares Association were explored here Aug. 15 at a day-long meeting attended by OPM officials, aircraft executives and members of the Association.

Approximately 16,000 workers are employed by the aluminum fabricating companies. According to Peter R. Nehemkis, Jr., special assistant in the defense contract service of OPM, about 8000 workers already are idle in the aluminum industry. Plans for placing educational orders for airplane parts with aluminum ware manufacturers are expected to be announced soon.

Wolf Creek Plant Begins Operations 2 Months Early

Milan, Tenn.

• • • Shell loading operations have started at the \$26,000,000 Wolf Creek Ordnance plant here, nearly two months ahead of schedule. In full production, the plant, which is located on a 23,400-acre site and is operated by Procter & Gamble Defense Corp., will employ 9000 persons.

AMERICAN WORKERS in Ulster: This group of technicians and workers from the U. S. are now stationed in northern Ireland where more than 800 Americans are doing work in connection with U. S. defense.

Photo by Wide World



Defense Plant Corp. Approves 12 More Lease Agreements

Washington

••• The Defense Plant Corp., RFC subsidiary, has approved lease agreements with these companies:

The Bullard Co., Bridgeport, Conn., for War Department machinery and equipment costing \$1,600,000.

The Aviation Corp., Republic Aircraft Production Division, Detroit, a \$92,022 increase in the existing lease agreement for purchasing additional land and machinery for the production of Army aircraft parts.

A. O. Smith Corp., Milwaukee, for machinery and equipment costing \$2,760,132 for turning out Army aircraft parts.

The Fafnir Bearing Co., New Britain, Conn., for machinery and equipment costing \$746,072 for the production of Army aircraft parts.

Koppers Co., American Hammered Piston Ring Division, Baltimore, \$900,000 for machinery and equipment and \$350,000 for land and buildings for the manufacture of Navy aircraft engine parts.

Arter Grinding Machine Co., Worcester, Mass., \$150,469 for machinery and equipment for manufacturing machine tools for the War Department.

Air Cruisers, Inc., Clifton, N. J., \$253,942 for land and buildings for manufacturing Army lighter-than-air craft.

Douglas Aircraft Corp., Santa Monica, Calif., \$74,200 for machinery and equipment, and \$447,970 for land and buildings for the manufacture of Army aircraft.

Packard Motor Car Co., Detroit, \$150,000 additional to the existing \$1,150,000 lease agreement for more machinery and equipment for turning out Navy marine engines.

Watson-Stillman Co., Roselle, N. J., a \$214,451 increase to the original \$185,548 lease agreement for the acquisition of machinery and equipment to manufacture hydraulic equipment for the Army.

North American Aviation, Inc., Inglewood, Calif., a \$795,323 increase to the existing \$2,300,000 lease agreement. For manufac-

turing Army aircraft, \$160,913 will go for machinery and equipment, \$634,410 for additional land and buildings.

The National Acme Co., Cleveland, \$488,000 for acquiring machinery and equipment needed to produce machine tool equipment for the War Department.

Carloadings for Week Ended Aug. 9 Down 1/2%

••• Freight carloadings for the week ended Aug. 9 totaled 878,549, a decrease of 0.5 per cent from the preceding week, the Association of American Railroads reported.

Coal loadings amounted to 166,429 cars, an increase of 285 cars above the week ended Aug. 2, while ore and coke loadings eased somewhat during the current week. Ore loading amounted to 76,687 cars, down 531 cars, while coke loading was 13,056 cars, a decrease of 75 cars from the preceding week. Total loadings this week are 151,476 cars.

The Joker in H. R. 5417

••• Only a few months ago, on March 7, 1941, the Congress enacted the Excess-Profits Tax Amendments of 1941 (H.R. 3531). These amendments were made applicable to 1940.

A very important provision in these amendments recognized the sound principle that a corporation should be allowed a fair return on its invested capital before any excess-profits tax was to apply; that if a corporation did not earn a fair return in any year on its invested capital it should be allowed to apply such a deficiency in earnings against income of subsequent years, but limited to a carry-over of not more than two years. This principle had been adopted in the original excess-profits tax law (Second Revenue Act of 1940) but it was applicable only to corporations whose normal tax net income of the taxable year was not more than \$25,000. Such a corporation could have the benefit of an un-used excess-profits tax credit carried over from the preceding taxable year.

It should be borne in mind that any income as defined in the statutes, and without regard to whether such income represented a fair return on invested capital, was already subjected to income taxes, the rates of which have been greatly increased in recent years. It was right, therefore, that income taxes were allowed as deductions in arriving at the income subjected to the excess-profits tax.

Relying upon the amendments enacted into law last March, corporations calculated their probable earnings and the taxes to be paid thereon and determined their fiscal policies for 1941, including capital expenditures for defense purposes, dividend payments, etc.

Now, by indirect methods, H.R. 5417 contains a proposal in Section 204(e) which will probably nullify nearly all, if not all, of the benefit of carry-over of the un-used credits from 1940 by requiring the computation of the carry-over for that year to be made on the basis of the reduced credit on invested capital for 1941 and by denying the deduction of the income tax paid for the year 1940. This seems most unfair and would result in a decided disadvantage to corporations which did not have sufficient earnings in 1940 to pay excess-profits taxes as compared with those corporations who were able to take advantage of the credits for that year in computing their tax. The corporation which could not take the credits in 1940 will pay a much higher tax for the two-year period of 1940 and 1941 in relation to its earnings than the corporation which could take advantage of the credits in 1940.

\$50 Million Expansion for Ship Propelling Units Announced

Washington

••• The Maritime Commission last week announced a \$50,000,000 program for expanding production facilities for steam turbines and gears needed for merchant shipbuilding construction.

To be financed under lease agreements with the Defense Plant Corp., the program involves the acquisition of additional facilities by these companies:

General Electric Co., Erie, Pa., and West Lynn, Mass., \$24,500,000; Westinghouse Electric & Mfg. Co., Lester, Pa., \$2,000,000; Allis-Chalmers Mfg. Co., West Allis, Wis., \$2,250,000; De Laval Steam Turbine Co., Trenton, N. J., \$1,250,000.

Commission Chairman Emory S. Land last week placed the immediate goal of the shipbuilding program at 1200 merchant ships by the end of 1943, or a production rate of two ships every day for the next two years.

Ford's Experimental Plastic Auto Called Economical, Strong

Detroit

• • • Conceding that the mass production of plastic motor car bodies "is still a long way off," Ford Motor Co. has unveiled, at Dearborn, the first car with such a body. Though it makes its appearance at a time when a steel shortage threatens the automobile industry's non-defense production, the plastic body is still in an experimental stage and is not ready yet to be substituted for the conventional steel body, Ford officials pointed out. It is, however, a long step forward in the dozen years of research based on Henry Ford's long-standing belief that some day he would "grow automobiles from the soil."

The plastic in the body is said to withstand a blow ten times as hard as steel can stand, and

springs back if dented. Repairs can be made by inserting a patch, smoothing it into position and cementing in place. As a result of the necessity for fewer fabricating and finishing operations, it is expected that bodies can be produced more economically with plastic than with steel although plastics raw materials are more expensive. "The relatively simple

See photo on page 68

rear compartment door," Mr. Ford said, citing an example, "when made of steel requires no less than seven stamping operations, while only two are required for the same panel made of plastic."

The Ford Motor Co. is said to have now under test an entirely new light engine, radically different from conventional gasoline engines, which Ford engineers hope to adapt to the plastic body car. It was also revealed that a few dies for production of plastic panels are already completed, al-

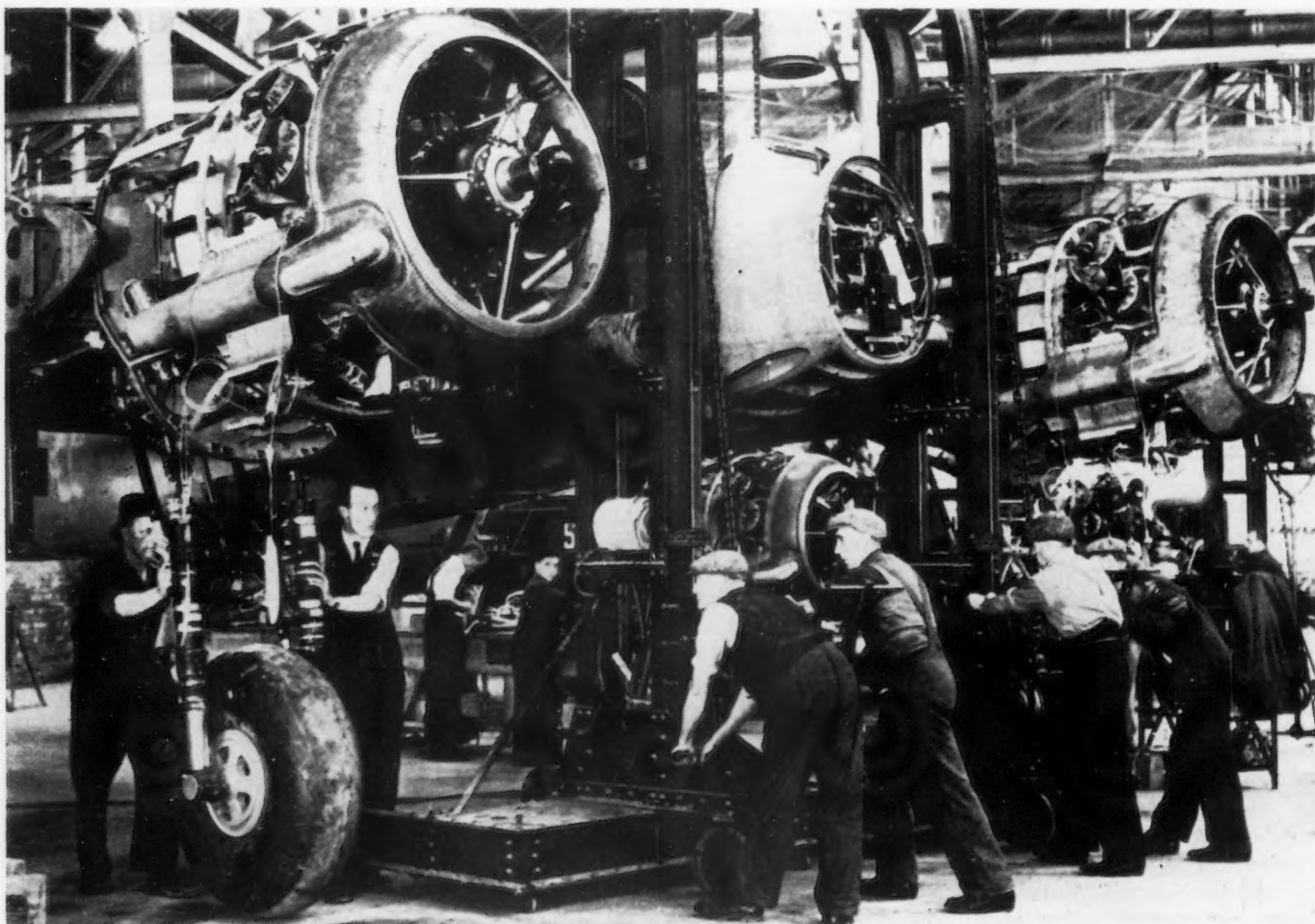
though most of the 32 panels in the experimental car were made "by hand." Many of these smaller panels are cemented together with a plastic cement and eventually it is hoped to reduce the number of parts to 14 plastic panels. The top now is said to be made of three panels; ultimately it will be one.

The car, put on exhibit at a Dearborn civic festival as a surprise to Ford's fellow-townsmen, is powered with the conventional V-8 60 hp. engine. It weighs 2300 lbs., compared to about 3000 lbs. for a steel bodied car on the same frame. The wheelbase is 110 in. Because of the fender design, blended into the hood in the front and into the body at the rear, the car is about three inches narrower than standard with no less room in the interior. The over-all height of the car is 63½ in. Ford engineers have stated that the weight of the car will be reduced still further when production is attempted.

The car, though designed to take

BEAU FIGHTER: Britons believe this war plane, pictured in a plant in England, to be the most powerful in the world. Its armament has proved deadly in night fighting, and is said to be heavier than in any other plane of its type.

Photo by Wide World



advantage of plastic materials, in appearance is not radically different from conventional steel models. There are fewer deep drafts, although the body is as streamlined as other cars of today. The entire superstructure of the body is plastic, except for a tubular welded frame on which the panels are mounted by screws and metal fittings. The total weight of the 14 major panels is 250 lbs. and the metal frame has a similar weight.

Among other plastic parts included in the car are all the windows and the windshield. These are of a composition used for aircraft windows, windshields and bomber observation enclosures.

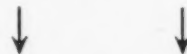
Composition of the plastic is of ordinary farm crops. A typical formula, according to the Ford Company, calls for the mixture of synthetic resin with the fibrous material derived from such crops as wheat, flax, raimi, hemp and spruce pulp. The forming of each panel takes about three minutes under pressure and heat, but the average time required for each panel is less because the panels are formed in multiple dies. (See story on Ford plastic car "What's the Past, Present and Future of Plastic Automobile Bodies?" THE IRON AGE, page 44, Feb. 27, 1941.)

The mixture is preformed through a suction device and then molded under a pressure of 1500 lbs. per sq. in.



Wilmington, Del.

••• Plastic shoe string tips will release about 500,000 pounds of metals, principally tin, to vital industries in 1941 alone, it is estimated by the Plastics Department of the du Pont Co. One pound of plastic replaces more than three pounds of metal.



Navy Bureau Reports On Steel Substitutes

Washington

••• Expanding its studies for conserving critical items, the Navy Department's Bureau of Yards and Docks reports that the fields of plastics, masonry, glass, special cements and wood products offer possibilities as substitutes.

Use of plastics and various com-

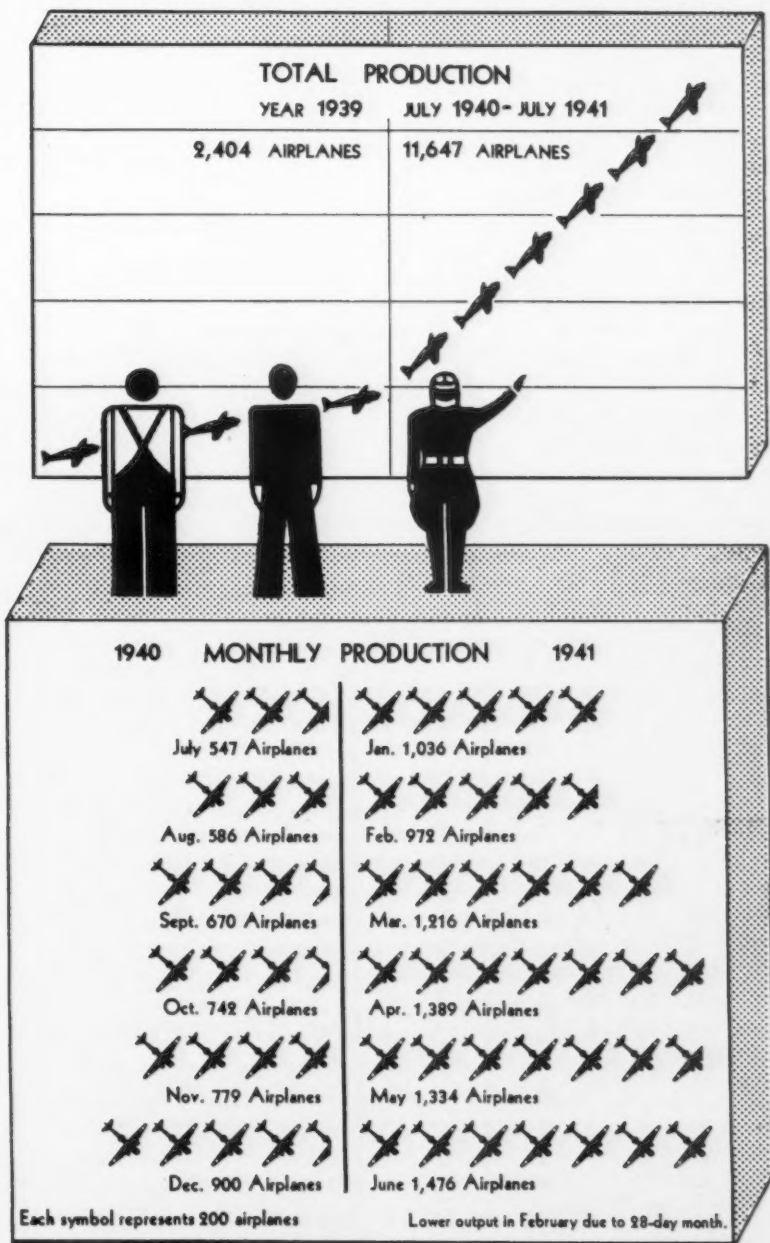
positions for piping materials was found to offer possibilities for substitution of metals.

For some time the bureau has issued memoranda to field offices, listing substitute materials for use in construction work where critical materials could be conserved or where scarcity was a problem.

Army Signs \$4 Million Bomb Contract with National Tube

••• The War Department announced Monday that an ordnance department award of \$4,141,500 worth of bombs has been made to the National Tube Co.'s Christy Park Works, McKeesport, Pa.

U.S. WARPLANE OUTPUT ZOOMS



Crucial period in the American defense emergency was the year between July 1940 and July 1941. During that period American aircraft manufacturers produced 11,647 military airplanes, nearly five times as many as were built in 1939.

Source: AVIATION NEWS COMMITTEE



OPM Clarifies Parts Of Pig Iron Order

Cleveland

• • • Clarification of several points important to gray iron foundrymen was achieved at a recent conference in Washington concerning Order M-17 governing pig iron allocations.

It was agreed that certain jobbing foundries whose business and customers make impossible the complete listing of orders for the "succeeding" month called for on Form PD-69, will follow the order as far as possible and supplement on the same PD-69 a similar listing based on the previous month's business substantiated by affidavits from

Complete list of American Iron & Steel Institute pig iron specifications to be used to filling out OPM form PD-69 appears on page 115.

customers of said month's business. Where, in considering one firm, a part of the succeeding month's business is covered (known definitely) and a part anticipated, total of known and anticipated business for that firm should not exceed total requirements for the preceding month supplied to said firm without authority of OPM.

The three months' inventory requested by the gray iron foundry committee was stated to be impossible, and refused. Shortage of pig is such as to necessitate a hand to mouth operation. Silvery pig is not to be included on Form PD-70, it was found. "Home produced scrap" includes all unpurchased scrap.

W. W. Rose, executive vice-president of the Gray Iron Founders' Society, Inc., said the committee which conferred in Washington consisted of executives of plants located in practically all sections of the country.



Very Few Non-Defense Pig Iron Shipments Likely

Pittsburgh

• • • Large pig iron consumers, among whom are sanitary ware and radiator makers and cast iron pipe manufacturers, face a red letter day on Sept. 1 unless their requirements carry priority ratings, according to

Copies of Form PD-73 Now Available

• • • We have been flooded with demands for copies of OPM Form PD-73, which must be filed with every order for steel after Sept. 1. Accordingly, we have made reprints of the form as it appeared on pages 81A-81B of the Aug. 14 issue of THE IRON AGE, and will supply emergency copies at the following prices:

25 copies or fewer	75c. for the lot
50 copies	\$1.25 for the lot
100 copies	1.75 for the lot
Additional hundreds	1.25 per hundred

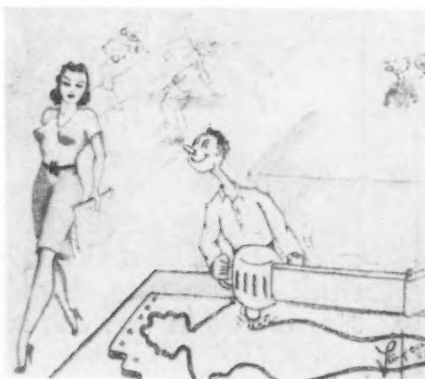
To avoid small bookkeeping entries, please send stamps to THE IRON AGE, 100 E. 42nd St., New York, for the quantity you want.

opinion here. After that date all pig iron shipment schedules will have to be approved by OPM and it is expected here that there will be little or no room for pig iron shipments to non-defense users, for the time being at least.

It may be several months before any representative tonnage will be shipped for non-defense purposes, owing to the heavy volume increase recently in pig iron demand from manufacturing plants working on defense orders and from steel companies who have been unable to obtain sufficient pig iron to maintain all-out production.

The pig iron to be set aside, amounting to 2 per cent of September production and which is to be subject to allocation by the OPM, will probably find its way for the most part to non-integrated steel companies holding heavy defense business.

Crisis in Defense Production



—North American Skywriter

Higher Costs Likely Due to OPM Order

Cleveland

• • • Operating problems and priority questions have come to the fore swiftly here during the past week following announcement of the mandatory setup on steel deliveries. Mills which roll on certain sizes and types of steel for long periods of time before switching to another size or type are concerned over the possibility of slower production and increasing costs. Perhaps a certain size of pipe is only rolled on an average of a few times a year, requiring three days to set up the mill and three days to tear it down after the rolling has been completed. Should these six days be lost for a defense order which in tonnage falls below the minimum necessary for a rolling?

Already some aspects of the defense program have been fraught with uneconomical factors which the steel industry has had to watch closely. A tremendous rise in scrap losses is only one aspect of the situation. A pipe line contractor, for example, may obtain a defense rating and then insist on 40-ft. plate lengths in order to better fit his welding equipment. If the mill agreed to 40-ft. lengths, as much as 8 ft. of steel might have to be scrapped.



Eastern Mills Vary Methods

Philadelphia

• • • Steel producers in this area are using a variety of methods to inform their customers that the new OPM form PD73 must be returned to the mills as quickly as possible. Some mills are notifying their customers by telephone and salesmen's visits, another mill plans to send out a general letter this week, and still another mill is letting its customers know full details of the new order in the form of a printed booklet containing the entire M-21 order and the letter sent out with the order by OPM.

The booklet, and a list of the customer's orders now on the books, will be sent out with the request that these orders be entered with their priority ratings, on form PD73 and returned.

Shipyard Seizure Awaits FDR Appeal

••• President Roosevelt has decided, it is reported from Washington, to make a final personal appeal to officials of Federal Shipbuilding & Drydock Corp. to accept the "maintenance of membership" clause demanded by CIO strikers, before he orders government seizure of the company's struck yards at Kearny, N. J. Acceptance of the membership maintenance clause, under which union members would be required to remain in good standing but non-union men would not be forced to join the union was recommended by the National Defense Mediation Board so that work might go forward on \$493,000,000 worth of defense orders for the Navy and Maritime Commission, tied up since Aug. 7.

Seizure of the yard, which had been held in abeyance pending the President's return from his conference with Prime Minister Churchill, was discussed on Monday by the President, Secretary of the Navy Frank Knox, Sidney Hillman, OPM associate director general, and William H. Davis, mediation board chairman. It was said that some government officials had pressed Myron C. Taylor, former chairman of the board of the United States Steel Corp., parent company of the shipbuilding corporation, to use his influence with his former business associates in an effort to persuade them to accept the mediation board's recommendation.



New Government Controller For National Steel Car Plant

Ottawa, Canada

••• Howard B. Chase, of Canadian National Railways, Director General of the Labor Research branch of the Department of Munitions and Supply, has been appointed government controller of the National Steel Car Corp. plant at Hamilton, Ont., to replace E. J. Brunning, who has acted as controller since the government took over control of the works last spring.

Cleveland Group May Train Girls for War Production

••• The Cleveland Emergency Defense Training Committee is giving serious consideration to training of girls for defense production jobs to relieve a critical skilled labor shortage in that area. C. W. Sheihing, Regional Staff Member of the committee reports. A WPA backlog of men which at one time reached 47,000 has been reduced to 6000, many of them unemployable.

Otto W. Winter, national chairman of the committee, reports that under the 29 schools of the training system developed and financed by the state of Connecticut, 3000 workers are being turned out every five weeks, trained for specific jobs in specific plants. Instructional literature on lathe operating has been added to the committee's educational treatises.

OPM Asks Molybdenum Steel Lectures; Newark Responds

••• With industry facing a growing shortage of tungsten, the Office of Production Management called on the country's metal technical societies to organize courses of instruction in the heat treatment of substitute molybdenum-type high speed tool steels. The appeal was made simultaneously with a recent OPM priorities order requiring users of conventional tungsten type high speed steels to accept half their requirements in molybdenum steel.

The first of these lectures in the New York area will be sponsored by the New Jersey Chapter of the American Society for Metals on Aug. 18 at Essex House, Newark. J. V. Emmons, metallurgist of Cleveland Twist Drill Co., will be the speaker.

Steel Sheets Reported Sold at 6c. a Pound

Cleveland

••• Approximately 1150 tons of hot and cold rolled steel sheets, offered for sale at an auction in nearby Elyria, Ohio, recently brought a high bid equivalent to slightly over 6c. per lb., according to reports in the steel trade here last week.

Compliance Section Established by OPM

Washington

••• The OPM priorities division, having increased its burden substantially by inaugurating full priority control for all steel products, last week took steps to smooth the operation of the priorities system by creating a new compliance and field section and by suggesting that manufacturers specifically assign special members of their staffs to handle priority matters.

To consolidate and coordinate the functions of the compliance section, the priorities field service and inventory control, Director of Priorities Edward R. Stettinius, Jr., appointed L. J. Martin, his assistant deputy director, to head a new control section, in which will be consolidated the activities of these individual units.

E. C. Laird, Jr., has been named senior consultant and J. H. Ward, assistant to Mr. Martin. L. Edward Scriven will direct operations of the compliance unit and the field service organization.

Heading an industrial contact and education unit will be Mason Manghum, who has arranged a series of priorities training courses for the benefit of trade association officials and industrial representatives interested in priorities matters.

Mr. Stettinius suggested that the appointment of staff members to deal with a company's priority problems would expedite the whole priority procedure. A number of manufacturers already have designated priority specialists on their staffs, a policy which Mr. Stettinius hopes will spread.

Trailer Maker Closes

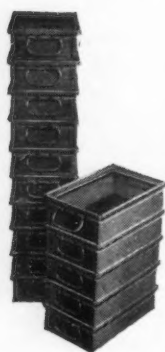
Alma, Mich.

••• Redman Trailer Co., automobile trailer makers, was closed last week because of inability to obtain steel, lumber and other materials. Several hundred men have been laid off indefinitely. Meanwhile, it has been learned W. H. Redman, president, and A. J. Hathaway, secretary, who acts also as purchasing agent, are searching for materials to resume production.

KEEPS SMALL PARTS ON THE MOVE



with **A-S-E** STACK-UNITS AND STACKING BOXES



WE all know the importance of small parts in production and assembly. Now with the "heat" increasing daily, the importance of handling them quickly and easily is even more pronounced. It is just for that reason that so many industrial concerns are utilizing A-S-E Stacking Boxes and Stack-Units. They speed up interdepartmental handling, help smash production bottlenecks — conserve storage space — play an important part in keeping production lines moving.

A-S-E STACKING BOXES are built to hold small parts with convenience and safety. Strong, reinforced construction prevents corners from opening up. Cannot telescope or unstack from vibration. Made in any size to fill production needs.

A-S-E STACK UNITS save valuable handling time. And the sloping bin front permits "pouring" of small parts. Parts are always accessible, providing important time-saving in assembly. Can be stacked as high as desired.

Send for the new, illustrated catalog for all the facts. You'll see how A-S-E Steel Boxes are solving the storing and handling problem of industrial concerns the country over. Write today—no obligation.

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ALL-STEEL-EQUIP COMPANY, Inc.
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NEWS OF INDUSTRY

Defense Plant Amortization Requirements to be Eased

Washington

• • • Proposals to clarify the provisions of the tax law covering amortization of defense plants have been laid before the House Ways and Means Committee in an effort to simplify administration and expedite the defense program.

In a move designed to ease certain requirements of the five-year amortization provision, Navy Secretary Frank Knox and Secretary of War Henry L. Stimson recommended in letters to Speaker Rayburn that the present 60-day limit, within which applications for certificates of necessity must be filed after beginning construction, be extended to six months. Experience under the new law, the letters said, has shown that in many instances it was impossible for the taxpayer to identify the facilities sought to be certified with any degree of accuracy within the 60 days allowed.

Another proposal would strike out the now-defunct National Defense Advisory Commission as one of the agencies required to certify applications under the five-year amortization provision.

The committee is expected to give prompt consideration to the proposals.

Steel & Wire Lifts Operations at Duluth

Duluth, Minn.

• • • Operations of American Steel & Wire Co. have been stepped up sharply here in recent months. The entire coke works will be in operation soon, according to C. F. Hood, president of the U. S. Steel Corp. subsidiary, who came here on an inspection trip Aug. 15. The plant consists of 90 Koppers by-product ovens, half of which have been operating. With the full unit in operation, around 35,000 tons of coke can be produced monthly. The additional coke will be sent to Carnegie-Illinois at Chicago.

Output of semi-finished steel by the wire company here has for some time been at the highest point in over a decade. The company ships some semi-finished to its plants in the Lower Lakes area.

Continental Motors Earns \$1,224,128 in Six Months

• • • Continental Motors Corp., Muskegon, Mich., reports a net profit of \$1,224,128 after all charges, including taxes, and depreciation, and after allowing reserves and charge-offs, for the six-month period ended June 30, 1941.

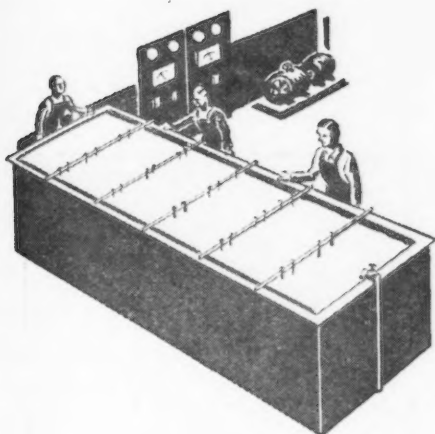
• • • Follansbee Steel Corp., Pittsburgh, and subsidiaries, report earnings for the quarter ended June 30, of \$167,365, before deduction of federal taxes. This compares with \$29,929 for the first quarter of the year. Earnings for the six months, after all charges except federal taxes, were \$197,294.

Coming Events

- Aug. 25 to 29—National Association of Power Engineers, Baltimore, Md.
- Sept. 4 to 6—National Association of Fan Manufacturers, summer meeting, Hershey, Pa.
- Sept. 17 to 19—National Industrial Advertisers Conference, Toronto.
- Sept. 18 to 20—Concrete Reinforcing Steel Institute, annual meeting, Colorado Springs.
- Sept. 23 to 26—Association of Iron and Steel Engineers, annual exhibition and meeting, Cleveland.
- Sept. 25 and 26—Society of Automotive Engineers, National Tractor Meeting, Milwaukee, Wis.
- Sept. 25 and 26—Powdered Metal-Lurgy Conference, annual meeting, Cambridge, Mass.
- Sept. 29 to Oct. 2—American Mining Congress-Metal Show, San Francisco.
- Oct. 1 to 4—Electrochemical Society, Fall Meeting, Chicago.
- Oct. 6 to 10—National Safety Congress and Exposition, Chicago.
- Oct. 8 to 10—Porcelain Enamel Institute, annual forum, Chicago.
- Oct. 14 to 16—American Railway Bridge and Building Ass'n, Chicago.
- Oct. 14 to 17—American Institute of Steel Construction, annual convention, New York.
- Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.
- Oct. 19 to 24—American Welding Society, annual meeting, Philadelphia.
- Oct. 20 to 22—American Gas Association, Atlantic City, N. J.
- Oct. 20 to 24—National Metal Congress, Philadelphia.
- Oct. 23 and 24—Society of Automotive Engineers, Tulsa, Okla.

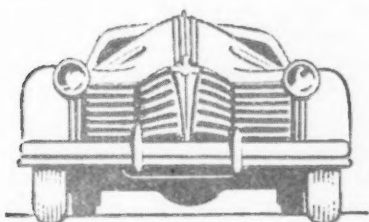
To the man with a problem

-OF FINISHING METAL TODAY



THE metal finishing industry faces a period of drastic adjustment. Curtailment of supplies makes necessary changes in time-honored procedure. Management has learned that today's problems must be met with *today's* resources . . . and tomorrow's developments may mean that new decisions must be speedily made.

With each plant the effect is different. Many contractors of defense work, for example, face the problem of plating new or unfamiliar parts.



In some plants, restricted supplies require a change in the cycle of operation. In others, enforced substitution of materials necessitates the use of new methods or processes.

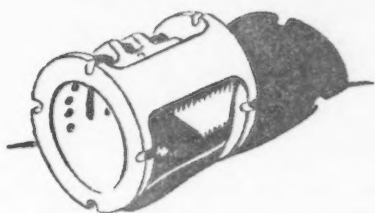
**UNITED
CHROMIUM**

INCORPORATED

NEW YORK • WATERBURY • DETROIT

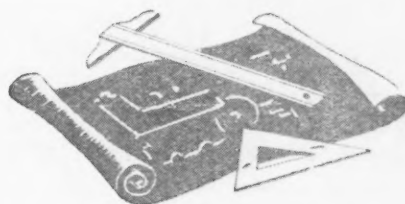
But whatever the situation, it must be studied in the light of the latest developments. No possible solution can be overlooked. Changes or adjustments must be made quickly and economically. These are the problems on which United Chromium believes it can be of real assistance.

In serving hundreds of licensees, many in the defense industries, United Chromium Engineers have



had wide experience in solving a great variety of finishing problems and in adapting plating programs to today's requirements. The technical assistance which we offer these companies includes:—Advice

and suggestions in connection with metal-plating problems; Service-proved data on suitable processes—including layouts, blueprints and estimated costs of equipment; Supervision and advisory counsel in enabling licensees to place their



installations into prompt and efficient production.

We will be glad to assist in determining how the U. C. processes and products outlined below can be of service to you. Write us briefly explaining the nature of your problem. An inquiry addressed to Dept. A, United Chromium, Inc., 51 East 42nd St., New York, N.Y. will bring a prompt response.

THIS IS HOW U. C. CAN HELP YOU!

In the use of **CHROMIUM PLATING**, undoubtedly the most important plated finish in the defense program.

For the heavier thickness of copper, **Unichrome* ALKALINE COPPER** gives a smooth, lustrous deposit—saves buffing time and labor.

Where plating speed is paramount, **Unichrome* ACID COPPER** offers an economical and easy method of meeting specifications.

The trend toward color and the shortage

of nickel make **ELECTROCOLOR*** (produced by the electrolytic color plating process) ideal for interior trim and decorative finishes.

For eliminating waste deposits of valuable metals on plating racks and work, **Unichrome* RESIST MATERIALS** and **RACK COATINGS** are efficient, economical and easy to use.

For resistant coatings on decorative articles, **Unichrome* CLEAR LACQUERS** offer an exceptional range of service characteristics.

*Trade Mark—Reg. U. S. Patent Office



A 24 Hour REVEILLE!

on
**Springs, Wire Shapes,
Snap-Clips, etc., for
U. S. Industry**

KEEP SPRINGS FLOWING to industry . . keep production on a continuous, unbroken schedule, 24 hours a day where necessary . . that's Cuyahoga's contribution to Uncle Sam's defense program and industry's production needs!

If you need springs, wire shapes or Snap-Clips as a vital part of your supply line, Cuyahoga has the production facilities, the precision and the craftsmen to serve you dependably.



U. S.-Brazil Trade Agreement Plugs Nazis Diamond Supply

• • • Germany lost its chief source of much needed industrial diamonds when the United States and Brazil concluded a trade agreement under which United States agrees to buy, through the Metals Reserve Co., the entire Brazilian surplus of strategic materials including an annual purchase of 300,000 carats of industrial diamonds.

Private purchases by American buyers will remain undisturbed and will be credited against the 300,000 carat total. Prices approximately equal to those prevailing during the first four months of 1941 will be maintained. The Brazilian government has agreed to issue export licenses and other adequate regulations to permit exportation of these strategic materials only to the United States.

Machinery Bids Sought for 2000 Hp. Chrysler Engine

Detroit

• • • Chrysler is asking machinery builders to submit bids immediately on equipment for production of the 2000 hp. V-type 16-cylinder engine which Chrysler Corp. has had under development for the past year. Production on the basis of 32 engines per 8-hr. day, is contemplated, and equipment for 40 per day may be installed. Test cells are now under construction on the plot of ground just north of the engineering laboratory in Highland Park. It is understood that plant facilities for production of these engines will be installed at the Highland Park location.

Wire Users Decrease Gage, Get More Length Per Ton

• • • Reduction in the use of metals is being effected by manufacturers of some wire products by simply decreasing the gage used. One of the manufacturers of hangers used in the dry cleaning trade points out that by using lighter gage wire, he is able to produce approximately 25 per cent more hangers out of every ton available.

In the recent past, wire has been allocated to non-defense manufactures of this sort on a tonnage basis.

Graham, J. & L. Metallurgist, Joins OPM As Consultant

• • • Herbert W. Graham, director of metallurgy and research for the Jones & Laughlin Steel Corp., has been granted a leave of absence and is expected to join the OPM as a consultant on steel expansion. He will specialize on Bessemer ca-



HERBERT W. GRAHAM

capacity and the duplexing process of production.

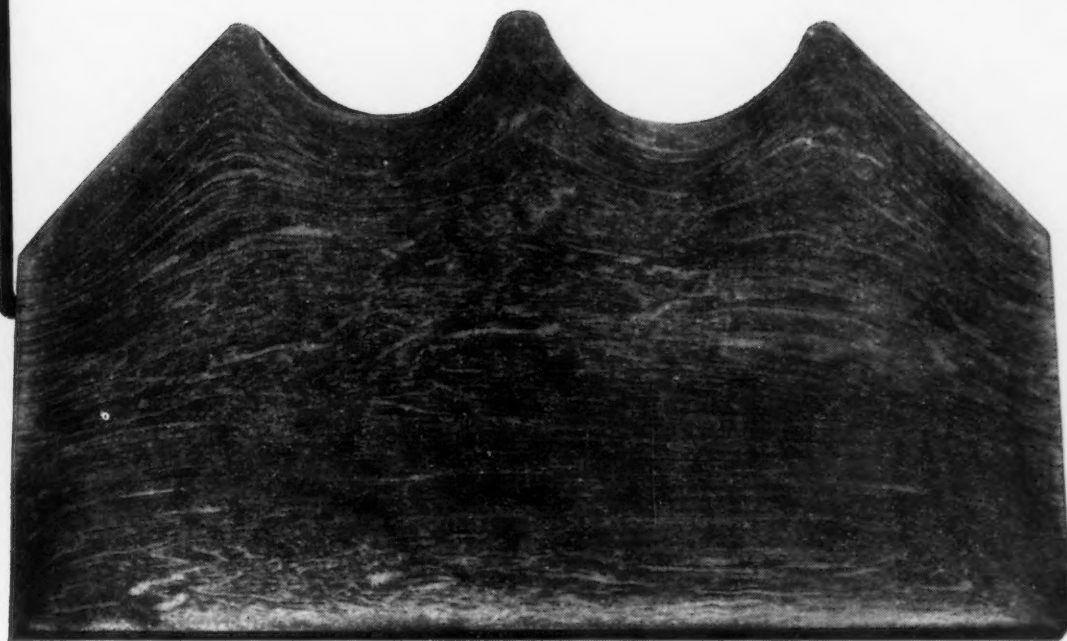
Mr. Graham graduated from Lehigh University in 1914 as a metallurgical engineer and has been connected with Jones & Laughlin since that time in various supervisory and technical capacities in steel works and metallurgical operations. For the past 13 years he has supervised all technical affairs for the corporation and initiated many of the steel making innovations at Jones & Laughlin, among which are high manganese steels, complete pilot mill setup, and the inauguration of precise and mechanical control through the use of photoelectric cells in Bessemer steel production.

Standards for Diamond Drill Parts Revised

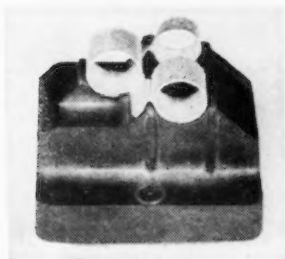
• • • Revised commercial standards aimed at minimizing replacement difficulties and providing dimensional interchangeability in diamond core drill fittings will be effective for the industry's 1942 production under action taken by the Diamond Core Drill Manufacturers Association, and the National Bureau of Standards.

DIE-TYPED DIES*

Save Time and Money



Cross-section of die illustrated, etched to show how metal flows to form die contour, and how the grain density is increased around working surfaces by "die-typing" process.



Front view of forged metallic belt link die with finished link.

This method has been in use by one of the leading automobile manufacturers in making large and small forging dies for almost a decade, and is now available to help speed your defense efforts.

Dies made by this process:

1. Increase production per die 50 to 200%.
2. Reduce non-productive time.
3. Insure exact and accurate duplicates.
4. Cut waste of die metals in die blocks.

Let our engineers go over your die problems with you and help you save **TIME** and **MONEY**.

**Die-typing—"A method for rapid duplication of most kinds of dies and molds which in some cases has saved up to 90% of the time ordinarily employed in making dies."*

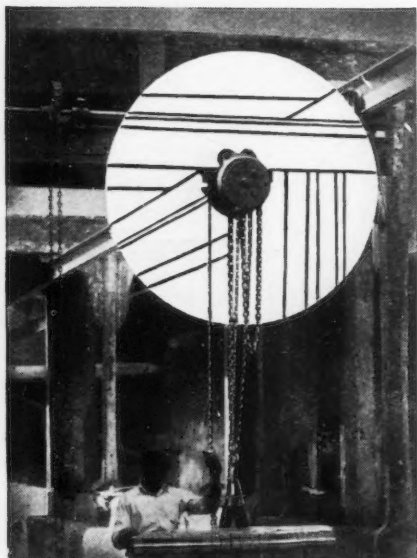
W. F. SHERMAN
Iron Age—
July 31, 1941

DIE-TYPING CORPORATION

3-135 GENERAL
MOTORS BUILDING,
DETROIT, MICH.



Faster
**CARGO HANDLING,
 CLOSE STOWING,
 VITAL NOW!**



Old hulls can be made to hold more if stevedores can be given greater stowage freedom. Sailings can be advanced by hours if loads inside the hull can be mechanically handled.

In this barge, maximum loads are being carried, sailing times advanced because this Reading Unit was installed. Even today, units like this can be obtained fairly quickly. An underhung, hand-powered traveling crane combined with a 3,000-pound multiple gear Reading Chain Hoist from stock was used.

The installation permits maximum head room and complete flexibility of load placement. Fewer men required. Greater safety. Could you apply the same set-up to increase storage facilities in your plant?

READING CHAIN & BLOCK CORP.
 DEPT. 29 READING, PA.

READING

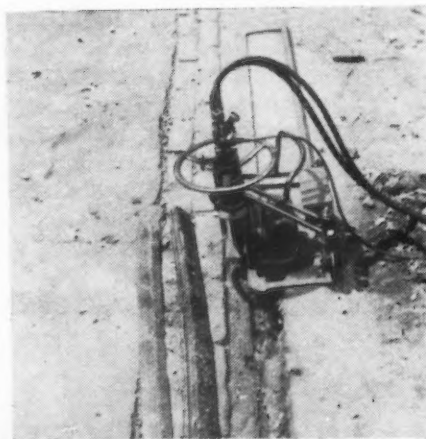
Chain Hoists, Electric Hoists,
 Cranes and Monorails

Lack of Priorities Hit Railroad Needs

Pittsburgh

... Unless the railroads obtain, or the government takes the initiative and assures a preference rating for railroad material including rails and track accessories, a serious situation is expected to face the railroad in-

Scrap Rails: With the steel industry and the scrap trade seeking new sources of scrap to keep the nation's steel mills operating, Linde Air Products Co. reports developing a new, economical method of reclaiming abandoned street car and railroad rails for scrapping. Removal of the rails from the ground without breaking the adjacent pavement is possible with this device, a portable oxy-acetylene cutting machine, Linde claims. Often the cost of opening and relaying the pavement to get at the rails is so expensive that it discourages the salvaging of the rails. The machine runs on tracks, see photo below, making continuous operation possible. It is fitted with a bevel-cutting nozzle. In use, a cut is made along the groove of the rail, as shown in lower photo, severing the top of the rail from the web in longitudinal sections. This device is said to be effective even when the pavement has been laid flush with the top of the rail.



dustry after Sept. 1 when the full effects of the steel priority order will be felt, according to informed opinion here.

Steel mills have a mandate from the OPM to complete defense orders ahead of non-rated business. Thousands of tons of rails now on mill order books and urgently needed by railroads have no priority rating. One large railroad system is said to have less than 500 tons of rails on hand, whereas demand from defense industry requiring trackage is at an all-time high and in addition road bed repair programs are being retarded.

Even though some steel companies have the capacity to produce the rails, heavy British business, as well as American defense needs, may take away raw steel originally scheduled for rail production, since such action, if necessary, would follow instructions contained in the steel priority order.

Estimates on rail requirements for 1942 programs run as high as 1,500,000 tons. Some of this tonnage has already been placed but all 1941 orders have not yet been completed.

Atchison, Topeka & Santa Fe has asked ICC approval of a financing arrangement to permit its purchase of \$25,000,000 worth of equipment. Of this, 300 50-ton steel box cars, costing \$9,150,000, and 500 50-ton steel automobile cars, costing \$1,860,000, would be ordered from the Pullman-Standard Car Mfg. Co.; 200 50-ton steel gondola cars, \$568,000, 200 70-ton 16,000 gal. steel tank cars, \$734,000, and 75 70-ton steel hopper cars, \$294,750, to be made by the General American Transportation Co.; 59 stainless steel passenger-train cars, \$4,110,010, to come from Edward G. Budd Mfg. Co.; and 20 diesel electric locomotives, \$8,283,240, from Electro-Motive Corp.

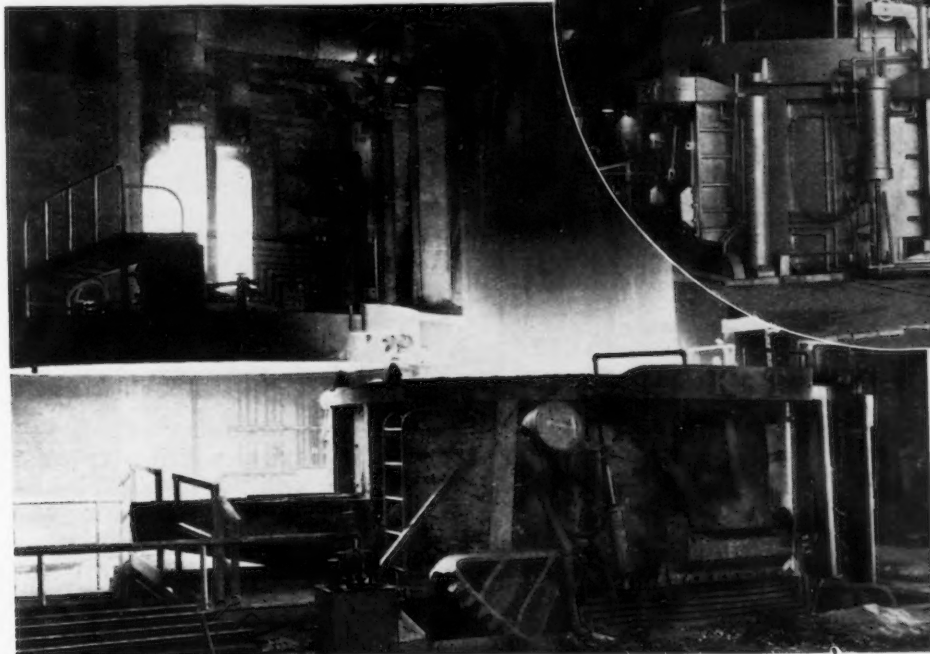
Steel Shortage Hits Ohio Metal Plant

Youngstown

... Because of current shortage of steel, Reliance Steel Corp. is closing its sheet metal manufacturing division plant here. The remaining stock and the office personnel will be moved to Cleveland where the company's main warehouse and offices are located.

Lectromelt

**THE LARGEST TOP
CHARGE ELECTRIC
FURNACE IN THE
UNITED STATES**

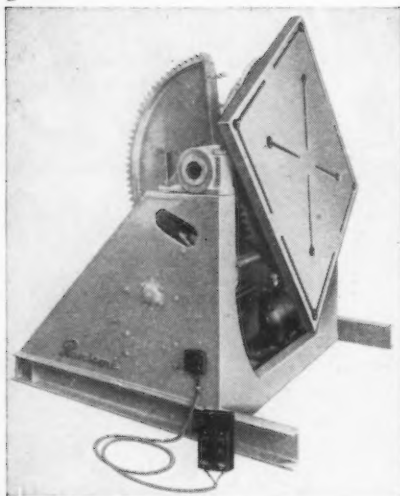


The 50-ton top charge LECTROMELT furnace pictured here is now in operation at the Copperweld Steel Company, Warren, Ohio, on alloy steel production. The upper view shows the furnace in normal operating position. The lower view shows the furnace with roof rotated to permit quick charging with drop bottom bucket. Two furnaces of similar size are now under construction in our shops.

Both top charge type and door charge LECTROMELT furnaces are available. LECTROMELT furnaces are built in standard sizes ranging from 100 tons down to 25 pounds capacity. Two 75-ton machine—door charge furnaces are in operation at a large Eastern steel plant. The top charge type of furnace results in savings in man hours, power, electrodes, and refractories. Write for details.

**PITTSBURGH LECTROMELT
FURNACE CORPORATION
PITTSBURGH, PA.**

HERE'S AN ADVANTAGE WORTH CONSIDERATION



The T-slots in the table top of Ransome Positioners facilitate setting-up pieces to be welded. Four radial and four longitudinal slots mean only one quick set-up before starting to weld.

Ransome. Welding Positioners

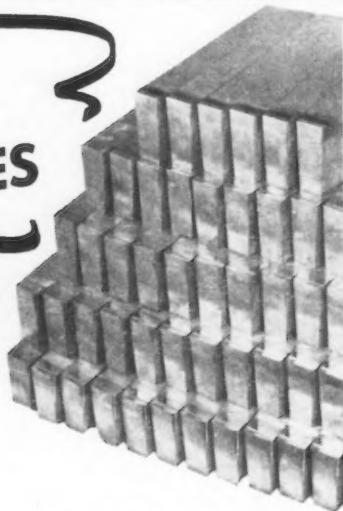
- Save labor time
- Reduce crane service
- Increase production
- Produce better welds

Industrial Division

RANSOME CONCRETE MACHINERY COMPANY
DUNELLEN NEW JERSEY

**SOLDIERS
BEHIND THE LINES**

KENNAMETAL Base Facing Tools for Machining 75mm. Shells



Foremost in the present Defense effort are the Nation's machine shops . . . busy turning rough forgings and castings into finished parts for guns, shells, tanks, planes, ships, and other armament. And vital to increased machine shop production are KENNAMETAL steel-cutting carbide tools. For KENNAMETAL turns, bores, and faces steel of all hardness up to 550 Brinell at three to ten times faster speeds than high speed steel . . . increasing machine tool production from 30 to 50%.

Standard and Modified Standard KENNAMETAL tools are now shipped within 10 days of receipt of order; standard blanks within 3 to 4 days. On unusually large orders, partial shipments are made within the above times. Some standard KENNAMETAL tools (supplied in grade KM only) are now carried in stock for immediate delivery. Write for details.

McKENNA METALS Co.
144 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

Priorities Jobless Will Reach 2,000,000, Henderson Estimates

Washington

• • • New Dealers are rolling up their sleeves to make America over after the war. Of course the shock troops of social and economic planning never have been demobilized, and long-range planning is by no means a new experience for them. But never during the past eight years have fields been so fertile for New Deal theories to take root as they will be in the post-war era.

Even a top-soil thinker can see that industry will be emerging from the stupor of stringent government controls imposed by a wartime economy, that the country will abound with excess plant capacity much of which will be in government hands, that a dislocated and decentralized industry will be overburdened with taxation and plagued with unemployment.

Enterprising Administration stalwarts, however, are looking further than this. They visualize in the post-war period the unfolding of a vast proving ground on which they can test untried doctrines which were temporarily put on ice when industrialists were recruited by Washington to mobilize for national defense. To pull the country out of a post-war slump, New Deal strategists are pondering the potentialities, quietly laying their plans.

Of all the ideas in the incubation stage, this much has been publicized: The Federal Works Agency has a \$25,000,000,000 program of public works reserve in mind. The National Resources Planning Board, which by Presidential instruction, concerns itself with "the natural and human resources of the Nation," is working on a formula for transferring millions of men from "all-out production for defense to all-out production for normal living, when this war is over." At the same time, the Labor Department's Bureau of Labor Statistics has undertaken a \$100,000 study of post-war employment.

Federal Works Administrator John M. Carmody, responding also to a White House request that a national shelf of work projects be

Lack of Material Causes Talon Layoff

Meadville, Pa.

• • • Approximately 14 per cent, or 630 out of a total of 4500 employees of Talon, Inc., here, have been furloughed indefinitely because of inability to get certain materials, particularly copper alloys, according to company officials.

It was said that it is impossible, due to changing conditions, to predict the time or extent of further layoffs. Nickel silver, a copper-containing alloy, is used in the manufacture of zippers and because of the national defense program the company has been unable to obtain enough of this material. It is understood Talon is considering substitutes, but here again it faces the threat that even these substitutes may be unavailable due to national defense.

prepared for post-war use, has set his mimeograph machines grinding out the results of a preliminary survey indicating that "a backlog of needed works and services to the extent of four or five billion dollars a year" will be needed when defense needs and economic conditions make their construction or operation feasible or desirable.

The National Resources Planning Board, now a branch of the executive office of the President, has embodied its latest plans on the subject of post-war planning in a booklet, "After Defense—What?" outlining the objectives of its formula for full employment, security and up-building the country, the board talks in terms of "balancing our national production-consumption budget at a high level with full employment, not at a low level with mass unemployment." The agency suggests that this can be done without sacrificing present labor standards if in decentralizing post-defense emergency activities the country utilizes to the utmost what the board calls "our system of modified free enterprise."

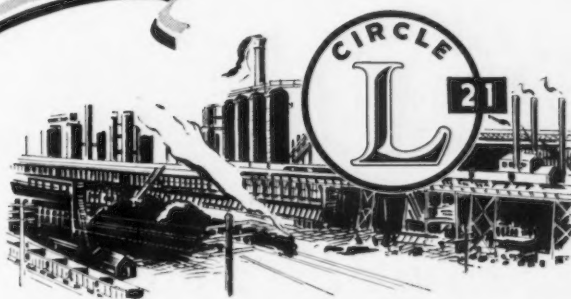
Labor Department economists, in seeking a method for retaining full employment after the war boom, already have launched initial studies under the direction of Donald Davenport, former economics instructor at Harvard University. Their effort is aimed at

SYMBOLS of DEFENSE



"OLD HICKORY" was the nickname of the A.E.F.'s 30TH Division...and hickory tough these men from Tennessee and the twin Carolinas proved themselves. On September 29, 1918, they were among the troops who cracked through the "impregnable" Hindenburg Line. They faced the full fury of the Meuse-Argonne...oper-

ating with the British throughout the duration of that decisive campaign. The fighting on the Somme found them active. In sixty-nine days of front line action, the 30TH suffered casualties of 8,415. Today, the men of Tennessee and the Carolinas are in training...ready once more to repel any attack on American freedom.



REPPELLING the persistent attack of corrosion is one of industry's major problems. Shining symbol of this defense campaign is Circle ① 21—famous "18 and 8" Columbian bearing alloy of the Lebanon Steel Foundry. With a carbon maximum of only .07, readily obtained by Lebanon's modern induction type furnaces, its Columbian content is ten times Carbon. Circle ① 21 meets the U. S. Navy's specific corrosion requirements, in accordance with Specification 46-S-27 Grade 1 Welding.

LEBANON STEEL FOUNDRY • LEBANON, PA.

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON *Stainless and Special Alloy* **STEEL CASTINGS**

determining the kind and the extent to which employment will disappear when the production of war material returns to a low level. Some 30-odd experts, fortified with a \$100,000 appropriation, hope to trace the transition from a period of full employment when an estimated 3,300,000 new jobs will have been created down through the post-war era.

While Administration econ-

omists are drawing up additional plans, key New Dealers are berating the steel and aluminum industries for an alleged lack of planning and for their failure to anticipate defense requirements in advance and expand production accordingly. Testifying before the House Banking and Currency Committee last week, OPACS Administrator Leon Henderson, sought to place on the shoulders of the steel



AUTO PRICE RULER: This is Cyrus McCormick, of Santa Fe, the newly-appointed price executive of the OPACS automobile and truck section. Son of the inventor of the reaper, McCormick is Republican national committeeman from New Mexico.

NOTED FOR SMOOTHNESS

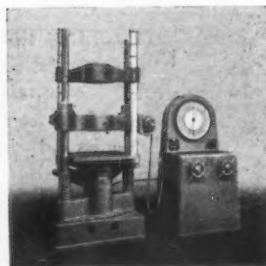
ONE of the benefits of Hele-Shaw Fluid Power (oil under pressure) that you are going to like is its smoothness. The oil under pressure from a Hele-Shaw pump is transmitted to the press, ram, or driven machine in a smooth, even flow. There's no vibration or thumping or jerking in the driven machine. The ram speeds up or slows down quickly. Even flow is responsible for greater accuracy in operation, longer life of the machine. Smoothness of Fluid Power is produced by a multiplicity of plungers in the pump itself. Investigate the smooth operation of Hele-Shaw Fluid Power and the many other advantages of Fluid Power by sending for our catalog.

NOTE IT FOR SMOOTHNESS

THE Hele-Shaw Fluid Power Pump



Cross sectional view of the Hele-Shaw Pump showing the multiplicity of plungers which are responsible for the smooth, even flow of Hele-Shaw Fluid Power.



Southwark - Tate - Emery Universal Testing Machine, smoothly powered by a Hele-Shaw Pump.

OTHER A-E-CO PRODUCTS: LO-HED HOISTS, TAYLOR STOKERS, MARINE DECK AUXILIARIES



AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

industry the blame for unemployment which he expects to result from the priorities system. Mr. Henderson related to the committee what he described as the early unsuccessful efforts of the Administration to sell the steel, aluminum and other industries on the necessity for expanding production. He called it "a failure of production management," estimated that "priorities unemployment" might eventually exceed 2,000,000 men temporarily, but neglected to point out that while New Dealers were clamoring for more steel capacity, the government itself had no estimates of steel defense requirements.

While Mr. Henderson throws out his charge of lack of planning by the steel industry, another government agency—the OPM's Production Planning Board—appears to have been buried in complete

obscurity since its creation six months ago. Originally established by OPM Director of Production John D. Biggers to study industrial planning during and after the emergency, the board enjoys little more than nominal existence.

Its former chairman, Samuel Richard Fuller, Jr., president of the North American Rayon Corp., left the board at the time he resigned his job as chief of OPM's materials branch. Mr. Fuller, who was in charge of steel and machine tool procurement for the Navy during the World War and who won high commendation from Bernard Baruch, chairman of the War Industries Board, was succeeded as board chairman by Robert E. Doherty, president of the Carnegie Institute of Technology. Dr. Doherty is understood to have since relinquished his job as board chairman to return to Pittsburgh.

Another member of the board is Harry L. Hopkins, lend-lease administrator and former head of the WPA, who has recently returned from spectacular trips to London and Moscow as the President's personal representative.

The OPM planning board was specifically assigned the job of making recommendations based on world war production experience, the industrial mobilization plan of the War and Navy Departments, and the procedure followed during the eight-month life of the National Defense Advisory Commission.

If the board has made reports on such subjects, OPM has kept a tight lid on its recommendations. Moreover, the White House has demonstrated an inherent skepticism of World War production experience by failing to reorganize existing defense machinery along the lines laid down then, and there is little evidence that the industrial mobilization plan of the War and Navy Departments was used as a pattern by Mr. Roosevelt in organizing and reorganizing defense machinery.

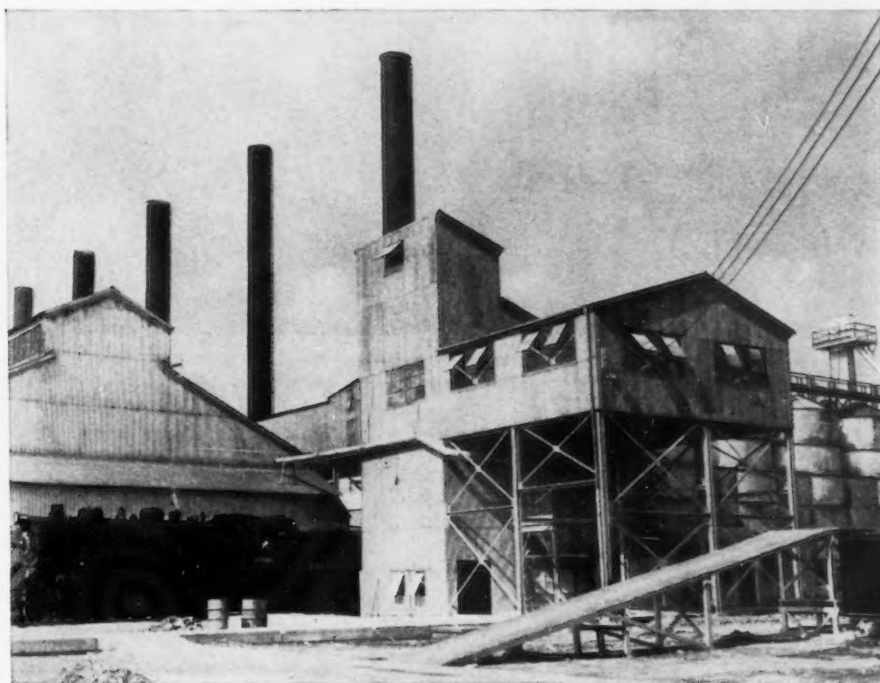
Some observers say that the President would like to forget the ill-fated National Defense Advisory Commission as evidenced by its complete elimination and his action in replacing it with the Office of Emergency Management, and its highly-publicized subsidiaries, OPM and OPACS.

24,672 Fewer Workers Than Jobs in Chicago

• • • For the first time since the depression, Chicago has more jobs available in business and industry than there are men to fill them. At close of last June, 24,672 unfilled jobs, exclusive of domestic help, were available. This figure includes such occupations as tool-makers, machinists, office and

clerical help, and all other types of skilled workers. Age is no longer a handicap in getting a job, either, according to Frank J. Graves, state inspector of private employment agencies. Taking the 1936-39 average employment as 100, manufacturing industry employment in Illinois today stands at 133.1 compared with 113.7 in 1929.

Defense materials are produced in these galvanized ARMCO Ingot Iron buildings. The metal is constantly subjected to a highly corrosive industrial atmosphere.



YEARS MORE SERVICE... FOR LESS THAN 1¢ A POUND EXTRA

Farsighted engineers in America's expanding industrial plants are looking ahead. They want long "after-the-emergency" service life and low maintenance costs from today's investments in new warehouse and factory buildings.

That's why galvanized ARMCO Ingot Iron is being used to cover so many new structures needed by defense plants. This durable metal has the longest service record of any low-cost iron or steel sheets. Installations dating back as far as 1909 are in good condition today. Yet galvanized ARMCO Ingot Iron with all its durability costs less

than a cent a pound more than ordinary galvanized steel.

Use extra-durable galvanized ARMCO Ingot Iron* on your new buildings for long life and low maintenance costs. The American Rolling Mill Company, 2351 Curtis Street, Middletown, Ohio.

**For immediate painting and long paint life specify galvanized ARMCO Ingot Iron PAINTGRIP sheets.*



ARMCO INGOT IRON

Government

War Dept., Ordnance:

Acomatool Co., New York; gages.	\$1,864
Ahlberg Bearing Co., Chicago; bearings, ball and roller	29,299
Allegheny Ludlum Steel Corp., Dunkirk, N. Y.; rod, steel	1,512
American Brake Shoe & Foundry Co., American Forge Division, Chicago; punches and dies	13,400
shell forgings	507,960
American Brass Co., Waterbury, Conn.; bar, brass and copper; rod, copper; and plate, copper.	1,150
brass cups	16,047,668
bronze	24,229
brass rod	2,230
American Cast Iron Pipe Co., Birmingham, Ala.; bends, crosses, couplings, elbows, flanges, etc...	3,248
American Chain & Cable Co., Adrian, Mich.; parts for gun carriages	3,636
American Cutter & Engineering Co., Detroit; nuts	1,620
American Locomotive Co., Schenectady; steel forgings	392,040
American Locomotive Co., Railway Steel Spring Division, Latrobe, Pa.; springs, volute, steel	1,503
American Safety Razor Co., Brooklyn; housings for shells	400,925
American Smelting & Refining Co., Federated Metals Division, Whiting, Ind.; metal	1,019
American Steel & Wire Co. of New Jersey, Donora Works, Donora, Pa.; bars, steel	225,164
Ampco Metal, Inc., Milwaukee; welding rods	3,345
Ampco Twist Drill Co., Jackson, Mich.; twist drills and reamers.	3,394
Armstrong-Blum Mfg. Co., Chicago; hydraulic hack saws	5,208
machines, hack saw	26,040
Armstrong Cork Co., Lancaster, Pa.; cases, cartridge	520,000
Arrow Metal Products Co., Detroit; fixtures	12,919
Associated Spring Corp., Barnes-Gibson-Raymond Division, Detroit; clips	1,560
Atlantic Mfg. Co., Philadelphia; projectiles	9,500
Austin-Hastings Co., Inc., Cambridge, Mass.; radial drills	25,232
shear, billet	5,696
Automatic Machine Products Co., Attleboro, Mass.; primers, percussion	108,000
Babcock & Wilcox Co., New York; install steam generating unit ..	121,887
Baldwin-Southwark Corp., Eddystone, Pa.; parts for presses	3,101
Bastian Bros. Co., Boston; badges, hand press	1,210
Bearings Co. of America, Lancaster, Pa.; bearings	7,128
J. E. Bernard & Co., New York; steel bars	1,324
Boonton Machine Shop, Boonton, N. J.; cutters	2,049
Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.; anvils and primer cups	12,003
Brown & Sharpe Mfg. Co., Providence; calipers, squares, gages, etc.	2,025
mills, end	1,442
pumps	1,002
Budd Wheel Co., Detroit; cap nuts, wrenches, gaskets, etc.	8,465
Bullard Co., Bridgeport, Conn.; parts for machines	1,573
Carboloy Co., Inc., Detroit; furnaces, tools	137,747
Carlisle Hardware Co., Springfield, Mass.; files	1,265
Carnegie-Illinois Steel Corp., South Chicago; steel, molybdenum	1,052
Carnegie-Illinois Steel Corp., Pitts-	

NO GHOST CHAINS TO HAUNT YOU

When you handle your loads with a Zip-Lift, there is no chain to interfere because this is a real wire rope hoist. There's no tangle, no dangle, no jangle.



Sold
THROUGH
INDUSTRIAL
DISTRIBUTORS

Its price is low — yet here are the quality features you find only in the more expensive equipment. It uses preformed, non-spinning cable; it's full electric, with push-button control—with crane type limit switch and two brakes for maximum safety. All mechanical parts are 5 times stronger than rated capacity. Operates on any standard electric circuit. Prices start at only \$140, completely equipped, ready to install. Available with interchangeable mountings for bolt, hook, or trolley suspension. Write for bulletin H-20.

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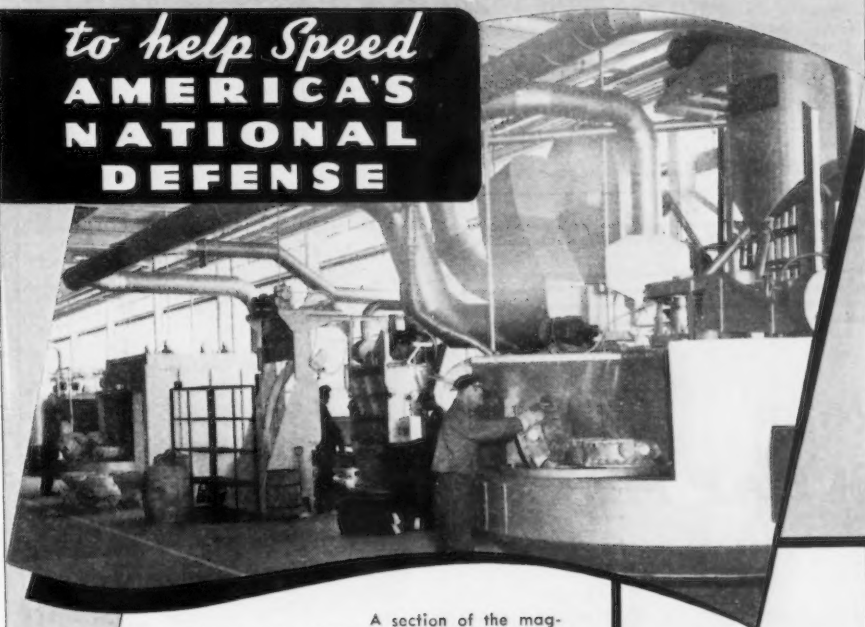
AWARDS

Awards . . .

burgh; bar, steel, carbon	5,399
Chambersburg Engineering Co., Chambersburg, Pa.; hammers, air operated, motor driven	3,050
Cincinnati Ball Crank Co., Cincinnati; bursting casings	284,050
Cincinnati Milling Machine and Grinders, Inc., Cincinnati; parts for milling machines	3,155
Cincinnati Planer Co., Cincinnati; parts for planers	9,562
Cincinnati Time Recorder Co., Cincinnati; bursting with metal parts	14,834
W. E. Clark Co., Boston; steel, structural	3,249
Cleveland Tractor Co., Cleveland; parts for tractors	2,097
Columbia Steel and Shafting Co., Pittsburgh; bar, steel	3,863
Continental Motors Corp., Muskegon, Mich.; parts for engines	48,587
Continental Roll and Steel Foundry Co., E. Chicago, Ind.; castings	9,726
Copperweld Steel Co., Warren, Ohio; steel	24,070
Covel Mfg. Co., Benton Harbor, Mich.; grinders	91,270
Cutter, Wood & Sanderson Co., Cleveland; reamers, end mills, drills	33,000
Crucible Steel Co. of America, New York; steel	3,396
Davenport Electric Contract Co., Davenport, Iowa; installation of lighting system	10,243
J. H. Day Co., Cincinnati; screen- ing machines	4,885
Derbyshire Machine & Tool Co., Philadelphia; dies	6,740
C. O. Deveau Machine Tool Co., Charlestown, Mass.; fixtures	45,310
Dresser Mfg. Co., Bradford, Pa.; shell forgings	20,940
Drive-All Mfg. Co., Detroit, Mich.; gear boxes	4,495
John Dunlap Co., Carnegie, Pa.; cases, cartridge	962,500
Electric Device Co., Springfield, Mass.; install electrostatic air cleaner	52,650
Electric Household Utilities Co., Chicago; parts, booster	970,000
Engineering Products Corp., Bridgeport, Conn.; fans, blast	1,418
Ever-Tite Mfg. Co., Davenport, Iowa; mud guards for tanks	755,590
Ex-Cell-O Corp., Detroit; grinders cutting tools	1,380
Federal Cartridge Corp., Minneapolis; cartridges	8,898
Federal Machinery Sales Co., Chicago; shapers	8,750
Fox Munitions Corp., Philadelphia; gages	7,456
Gabriel Co., Cleveland; shell bodies Gallmeyer & Livingston Co., Grand Rapids, Mich.; grinders	1,639
Gas Weld Equipment Co., Inc., Boston; tools	127,500
General Metals Corp., Los Angeles; forgings	2,513
General Steel Castings Corp., Ed- dystone, Pa.; steel castings	31,086
General Tool and Mfg. Co., Irving- ton, N. J.; dies	610,000
General Tool Sales Co., Philadel- phia; drills	1,830
Gisholt Machine Co., Madison, Wis.; lathes	1,811
Grandahl Tool & Machine Co., Hartford; gages	47,250
Great Lakes Steel Corp., Ecorse, Detroit; steel	375,091
Guiberson Diesel Engine Co., Dal- las; parts for tool roll	29,400
Harnischfeger Corp., Milwaukee; electric crane	1,142
motor, trolley	698,357
	1,164
	2,127
	3,173
	23,160
	2,283

WHEELABRATING IS THE AMERICAN WAY

to help Speed
**AMERICA'S
NATIONAL
DEFENSE**



A section of the magnesium foundry at Wright Aeronautical Corp., Paterson, N. J., showing a WHEELABRATOR Tablast, a WHEELABRATOR Tumblast, and an American Sand Blast Cabinet for cleaning aircraft engine parts. 35 WHEELABRATOR machines are used in the various Wright plants.

★ ★ ★ ★

ALL over America—in shops large and small—WHEELABRATOR airless abrasive blasting equipment is a familiar sight wherever products for defense are being cleaned or finished.

It is speeding this work as never before—and is effecting material savings in doing it—because WHEELABRATING accomplishes in a few minutes what very often requires from 2 to 5 times as long to do otherwise.

That's why the great majority of products, such as shells, machine gun clips, tank parts, aircraft parts, gun barrels, armor plate, etc., are being cleaned by WHEELABRATING—the modern speed-cleaning process.



AMERICAN
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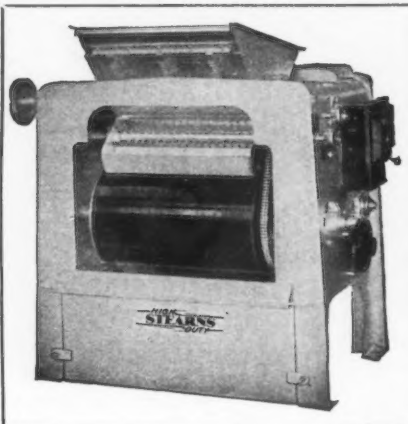
WHEELABRATING Brings You These ADVANTAGES

- 1 High-Speed Cleaning**
reduces costs, speeds up shipment of orders.
- 2 Cuts Cleaning Costs**
up to 50% and more because: it is faster; saves power up to 80%; saves labor; saves time in loading and unloading; saves space; saves abrasive; saves on operating and maintenance costs.
- 3 Removes All Trace of Sand and Scale**
down to the virgin metal, with the result that:
 - Machining and grinding are faster.
 - Tools last longer.
 - Inspection is simplified.
 - Hardness readings are accurate.
- 4 Improved Appearance**
—Wheelabrated products are bright, silvery, and uniformly clean.
- 5 Provides Perfect Bond**
for final finishing such as enameling, plating, galvanizing, painting, etc.
- 6 Produces Wide Range of Finishes**
from fine to coarse.
- 7 Handles Wide Range of Work**—from fine springs to heavy armor plate. Ideal for special and unusual applications.
- 8 Eliminates Chipped and Rounded Corners**
—only a minimum amount of stock need be allowed for finish machining.

GOVERNMENT AWARDS

Hartford Electric Steel Corp., Roxbury, Mass.; steel castings	1,582	Mass.; blocks, die, steel	46,975
Charles E. Hayes Co., Springfield, Mass.; wire	1,080	International Harvester Co., Fort Wayne, Ind.; trucks	5,200
Heppenstall Co., Bridgeport, Conn.; blocks, die, steel	46,975	International Machine Tool Corp., Indianapolis; lathes	397,332
Albert Hepworth Tool Machine Co., Philadelphia; hydraulic shapers	6,829	J. C. H. Automatic Machine Co., Philadelphia; die, progressive ..	2,775
Hesse Machine & Mfg. Co., Inc., Boston; gages	5,717	Jahn Mfg. Co., New Britain, Conn.; dies	2,805
Hoover Co., North Canton, Ohio; fuzes	126,000	John P. Kelly, Philadelphia; castings, bronze aluminum	1,656
Illinois Tool Works, Chicago; tools	3,850	Kilby Steel Co., Anniston, Ala.; forgings, shell	6,127,200
Ingraham Co., Bristol, Conn.; fuze plates	97,572	Landis Machine Co., Inc., Waynesboro, Pa.; machines	3,879
Industrial Steel, Inc., Cambridge,		Latrobe Electric Steel Co., Latrobe, Pa.; steel bar	2,953

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SCRAP METAL
is valuable
when you use**



Stearns **MAGNETIC TYPE "L" SEPARATORS**

Why throw away your profits?

There are plenty of extra dollars in that scrap pile of yours. Put this improved Stearns separator on the job of reclaiming your brass, aluminum, babbitt and other secondary metals from turnings, borings and metal refuse. It will more than pay for itself, efficient, economical, automatic. A definitely profitable investment.

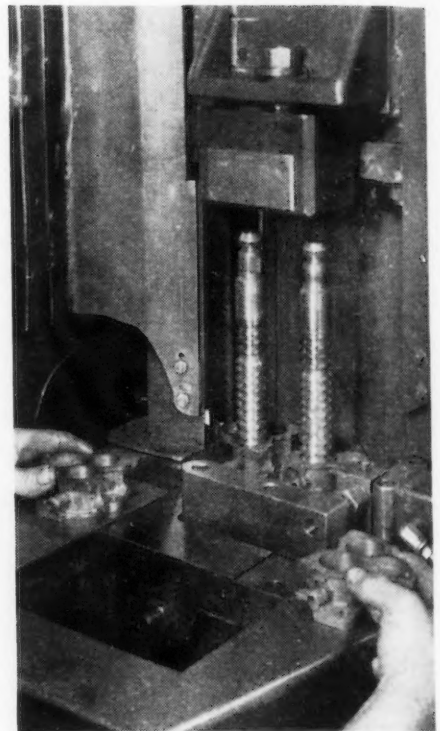


OUR NEW BULLETIN 46-A, AT LEFT*
WILL TELL YOU ALL ABOUT IT
WRITE FOR YOUR COPY TODAY.

Also Stearns Magnetic Pulleys (Bulletin 301), Spout Magnets (Bulletin 97-A), Suspended Magnets (Bulletin 25-B), Magnetic Clutches and Brakes (Bulletin 225).

**STEARNS MAGNETIC
MANUFACTURING CO.**

635 S. 28th St. Milwaukee, Wis.



USE OF CAST IRON BODIES for carburetors in place of die castings requires more machining and new tooling set-ups. The photograph shows a new 4-ton Colonial broach recently installed at the Ford carburetor plant at Milford, Mich., for removing the material from holes through gasoline-air mixture passes to the engine. Each broach here finishes both holes of the same throttle, working on two bodies simultaneously in the hydraulic clamping fixture. The holes were previously reamed. The first operation on the rough casting is also a broaching operation in which the flash from the outermost ends of the carburetor body is snagged to provide a finished surface from which subsequent operations will be located.

LeBlond Machine Tool Co., Cincinnati; lathes	528,998
Le Maire Tool & Mfg. Co., Dearborn, Mich.; gages	4,508
Lincoln Tool & Die Co., Detroit; fixture	1,580
dies	2,318
Lynd-Farquhar Co., Boston; cutting machines	2,514
Mackintosh-Hemphill Co., Pittsburgh; castings, steel	356,927
Magnus Tool & Die Co., Newark; guides, sleeves, & anvils	7,834
Manning, Maxwell & Moore, Inc., Cleveland; reamers	6,346
Marshall & Huschart Machinery Co., Chicago; planers and lathes ..	27,278
McGill Mfg. Co., Valparaiso, Ind.; bearings, ball	2,120
McGonegal Mfg. Co., East Rutherford, N. J.; grinders	2,270
Metal & Thermit Co., Jersey City; electrodes, welding	13,620
Michigan Tool Co., Detroit; machines, cutter	7,466
Monarch Machine Tool Co., Sidney, Ohio; lathes	17,786

GOVERNMENT AWARDS

Moore Special Tool Co., Bridgeport, Conn.; dies	4,900
Murray Mfg. Corp., Brooklyn; shell, bodies	1,792,000
National Die Co., Waterbury, Conn.; dies	11,400
National Magnesium Co., Newark; magnesium	1,850
National Supply Co., Spang-Chalfant Division, Ambridge, Pa.; shell forgings	5,093,130
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hartford; shanks and spools	2,650
Noblitt-Sparks Industries, Inc., Greenwood, Ind.; bombs	54,525
W. C. Norris Manufacturers, Inc., Tulsa; shell	574,024
Norton Co., Worcester, Mass.; wheels, grinding	1,265
O. K. Tool Co., Inc., Shelton, Conn.; cutters, holders, planers, etc.	1,839
Oliver Farm Equipment Co., Springfield, Ohio; crates, metal packing	804,100
Otis Elevator Co., Buffalo; castings, steel	32,031
Peco Mfg. Co., Philadelphia; fuze caps and bodies	677,500
Pennsylvania Tool & Mfg. Co., York, Pa.; dies	15,850
Philadelphia Engineers, Philadelphia; parts for machines	2,029
Pittsburgh Steel Co., Allentown, Pa.; shell	1,890,000
Pittsburgh Steel Foundry Corp., Glassport, Pa.; steel castings ..	486,620
Porter Machinery Co., Grand Rapids, Mich.; routing machines ..	1,457
Precision Mfg. Co., Philadelphia; gages	29,400
Henry Prentiss & Co., Boston; drilling and milling machines ..	66,098
Production Tool & Die Co., Inc., Springfield, Mass.; gages, inspection	1,859
Pullman Standard Car Mfg. Co., Butler, Pa.; shell	915,000
Quality Tool & Die Co., Indianapolis; gages	6,406
Reasoner Tool & Supply Co., Greenfield, Mass.; hand taps ..	3,436
Regina Corp., Rahway, N. J.; fuze, bomb nose	548,895
Rockford Machine Tool Co., Rockford, Ill.; machines and equipment	30,448
hydraulic slotter	19,101
Roessler Machine Co., Elkins Park, Pa.; tools	5,652
Joseph T. Ryerson & Son, Inc., Chicago; tank parts	2,677
SKF Industries, Inc., Philadelphia; bearings	1,353
Seneca Falls Machine Co., Seneca Falls, N. Y.; lathes	643,610
Sheffield Corp., Dayton, Ohio; gages	23,392
Sinko Tool & Mfg. Co., Chicago; gages	6,065
Springfield Stamp & Die Co., Springfield, Mass.; stamps, steel ..	1,296
Standard Gage Co., Inc., Poughkeepsie, N. Y.; gages	3,320
Standard Machinery Co., Providence; roller bearings	1,492
Struthers-Wells-Titusville Corp., Titusville, Pa.; steel tube for forgings	148,992
Superior Steel Corp., Carnegie, Pa.; steel	5,545
Swind Machinery Co., Philadelphia; grinders	9,610
Thurston Mfg. Co., Providence; mills, end	3,980
cutters	3,740
Timken-Detroit Axle Co., Wisconsin Axle Division, Oshkosh; transmission parts	3,471
Timken Roller Bearing Co., Canton, Ohio; steel	38,643
bearings	2,395
Titeflex Metal Hose Co., Newark; tubes	2,980

Transmission Engineering Co., Inc., Philadelphia; loading machines.	4,989
Tri-Metal Products, Inc., Conshohocken, Pa.; castings, manganese bronze base	5,459
Union Twist Drill Co., Athol, Mass.; drills	4,117
Unitcast Corp., Toledo, Ohio; castings, alloy steel	1,800
Vinco Corp., Detroit; gages	8,142
Weatherhead Co., Cleveland; fuzes ..	599,500
Jervis B. Webb Co., Detroit; fuze assembly conveyor	1,366
Williams, White & Co., Moline, Ill.; bulldozer, hydraulic	8,650
Yellow Truck & Coach Mfg. Co., General Motors Truck & Coach	

Division, Parts & Service Division, Pontiac, Mich.; wipers, windshield	1,224
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War Dept., Air Corps:

American Gas Accumulator Co., Elizabeth, N. J.; lighting trucks ..	\$70,690
Bell Aircraft Corp., Buffalo; adapter assemblies, gun mount, etc.	158,400
Bendix Aviation Corp., Bendix Products Division, South Bend, Ind.; wheel assemblies	60,450
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; indicators, fuel pressure	170,133
Bendix Aviation Corp., Scintilla Magneto Division, Sydney, N. Y.;	



Thor REDUCES SIZE, WEIGHT OF TOOLS WITH ANTI-FRICTION NEEDLE BEARINGS

THIS COMPACT THOR hand-model U1N Nibbler weighs only $3\frac{3}{4}$ lbs., yet packs in plenty of power. How was it made to fit the hand? "The Torrington Needle Bearing's very small O.D. makes possible our compact, streamlined gear case," says Mr. G. Larson, Independent Pneumatic Tool's Chief Designer, "and the Needle Bearing gives us good anti-friction service without trouble in the Nibbler and other Thor tools."



THE NEEDLE BEARING

operates at high speeds in this fairly inaccessible location, but no extra lubrication system is needed because large supplies of grease are held within its race. The Needle Bearing offers further economy in its quick and simple installation and by its surprisingly low initial cost.



If you have a bearing problem where high load capacity, small size, light weight, ease of installation and lubrication, and low costs are vital factors, investigate the Torrington Needle Bearing. Our Engineering Department will gladly help you adapt its advantages to your design. For details write for Catalog No. 104. For Needle Bearings to be used in heavier service, write our associate, Bantam Bearings Corporation, South Bend, Ind., for Booklet 103X.

THE TORRINGTON COMPANY, TORRINGTON, CONN., U. S. A. • ESTABLISHED 1866
Makers of Needle and Ball Bearings

New York Boston Philadelphia Detroit Cleveland Chicago London, England

TORRINGTON NEEDLE BEARING



DO A LITTLE MORE: Posters like these have been placed on plant bulletin boards of Manning, Maxwell & Moore, Inc., Bridgeport, Conn. "We felt that you might wish to reproduce these posters so that other companies might take advantage of the idea," Hamilton Merrill, vice-president of the company, told THE IRON AGE.

Photo by British-Combine

workshop tool kits, special tool sets and mechanical drawings ...	52,290
Scintilla magnetos & parts ...	289,518
Cincinnati Ball Crank Co., Oakley, Cincinnati; guns, lubricating pressure ...	18,625
Cincinnati Electrical Tool Co., Cincinnati; grinders ...	33,817
Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati; milling machines ...	186,425
Continental Machines, Inc., Minneapolis; machines ...	47,500
Curtiss-Wright Corp., Airplane Division, Buffalo Plants, Buffalo; parts for airplanes ...	168,911
Electronic Laboratories, Inc., Indianapolis; inverters ...	126,000
Fairchild Engine and Airplane Corp., Fairchild Aircraft Division, Hagerstown, Md.; airplanes and parts ...	4,746,951
Franco Machine Co., Racine, Wis.; presses ...	13,965
General Motors Corp., Allison Division, Indianapolis; manifolds, screen assemblies, bolts, studs, etc. ...	202,760
General Motors Corp., Delco Products Division, Dayton, Ohio; motor assemblies ...	84,600
Hayes Industries, Inc., Jackson, Mich.; wheel assemblies ...	28,437
Homelite Corporation, Port Chester, N. Y.; gasoline engine driven generators ...	2,141,298
Ingersoll-Rand Co., Cincinnati; air compressors ...	50,532
McCauley Steel Propeller Co., Dayton, Ohio; propeller blades ...	240,067
assemblies ...	67,987

What is the penetrating attractive BLACK finish for steel called...

What BLACK finish for steel reduces friction on BEARINGS

What low temperature BLACK finish is specified on many DEFENSE CONTRACTS

What is the answer to the shortage of plating materials

What BLACK steel finish is rust-resistant.

What BLACK finish is DURABLE for Tools, Bearings, stampings, guns, machine parts, etc.

What STEEL finish is economical, easy to operate and can be automatically controlled....

What steel finish will fit quickly into my production line...

It's **PHYTANUM BLENDED**

PENTRATE

PATENTED

Phytanium Blended is a specially developed method of dehydration and blending of Pentrate materials, assuring constant uniformity and eliminating the necessity of energizing or replacement due to "breakdown."

HEATBATH CORPORATION, SPRINGFIELD, MASSACHUSETTS

GOVERNMENT AWARDS

Racine Tool & Machine Co., Racine, Wis.; saws	65,168
Republic Steel Corp., Massillon, Ohio; steel rods, medium carbon, molybdenum, etc.	377,100
Seifreut-Elstad Machinery Co., Dayton, Ohio; milling machines	131,840
machines	62,491
L. E. Stevens Co., Cincinnati; material, labor and equipment for boiler	145,222
Stewart-Warner Corp., Chicago; guns, lubricating pressure	7,995
Taylor-Winfield Corp., Warren, Ohio; electric welders	67,205
Variety Aircraft Corp., Dayton, Ohio; pelorus assemblies	28,750
Western Industrial Engineering Co., Los Angeles; magnetic inspection apparatus	225,000
K. R. Wilson, New York; presses	18,488
Zahn Equipment & Supply Co., Columbus, Ohio; presses	6,982

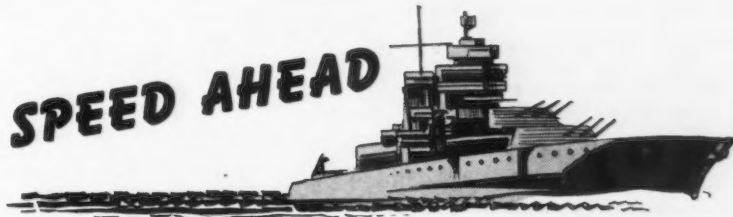
War Dept., Corps of Engineers:

Theo. Alteneder & Sons, Philadelphia; scale, aluminum alloy ...	2,000
American Sterilizer Co., Erie, Pa.; disinfecter, steam-jacketed, Advanced Flying School No. 6, Albany, Ga.	2,180
Ames Baldwin Wyoming Co., Parkersburg, W. Va.; shovels	21,560
S. Blickman, Inc., Weehawken, N. J.; coffee urn batteries and combination, Jefferson Barracks, Mo.	15,003
Chicago Bridge and Iron Co., Birmingham, Ala.; water tank, Columbus, Miss.	48,500
Chicago Pneumatic Tool Co., St. Louis; pneumatic riveting hammers, Fort Crook Assembly Plant, Nebraska	96,690
Commercial Shearing & Stamping Co., Youngstown, Ohio; bracket, outboard motor	2,229
Cummins Engine Co., Columbus, Ind.; electric power generating and distributing plant, Fort Church, R. I.	58,812
C. T. Dawkins, Tampa, Fla.; motor driven centrifugal pump unit and booster service, MacDill Field Tampa, Fla.	3,489
Electric Wheel Co., Quincy, Ill.; trailers	38,974
Enterprise Electric Co., Omaha, Nebr.; wire, weatherproof, Ft. Logan, Colo.	3,140
Fairbanks, Morse & Co., Boston; equipment for Warren Street Pumping Station, West Springfield, Mass., Connecticut River Flood Control Project	40,986
Florence Pipe Foundry & Machine Co., Philadelphia; pipe, water, cast iron, Kingston, Pa.	2,100
Frey Bros., Inc., Indianapolis; storage racks, tanks, and grating, Fairfax Aircraft Assembly Plant, Kansas City, Kans.	58,085
Fries, Beall & Sharp Co., Washington; wire rope and clips	3,940
General Electric Co., Schenectady; cable, Air Depot, Middletown, Pa.	2,400
General Motors Corp., Chevrolet Division, Detroit; trucks, Valdosta, Ga., Moultrie, Ga., and Sebring, Fla., airfields	8,393
Boyd H. Gibbons, Los Angeles; automobiles, Los Angeles Engineer District	4,160
Gould & Eberhardt, Newark; plain tool room shaper, Aircraft Assembly Plant, Kansas City, Kans.	2,341
Hobart Manufacturing Co., Troy, Ohio; puree mixers, Jefferson Barracks, Mo.	5,455
Wm. L. Hughson Co., San Francisco; trucks, Moffett Field, Cal.	6,769
Independent Pneumatic Tool Co., Chicago; accessories for air compressor	4,437

Ingalls Iron Works Co., Birmingham, Ala.; structural steel for two A.C. hangars, two control towers, boiler house and extension to boiler house, Eglin Field, Valpariso, Fla., and Tyndall Field, Panama City, Fla.	70,483
Johnson Motors, Division of Outboard, Marine & Mfg. Co., Waukegan, Ill.; Outboard motors ..	23,470
Jones & Laughlin Steel Corp., New Orleans; door assemblies, including hangar doors	9,290
W. H. Kiefaber Co., Dayton, Ohio; vacuum pumps	4,049
LeRoi Company, Milwaukee; spare parts—pneumatic paving breakers	3,328

Machine Tool & Supply Co., Tulsa, Okla.; hydraulic surface grinder, Aircraft Assembly Plant, Tulsa, Okla.	3,520
metal shapers for Tulsa plant ..	8,362
sliding geared head engine lathe for Tulsa plant	14,804
Maine Steel, Inc., South Portland, Me.; anchors	8,078
Market Forge Co., Everett, Mass.; steamers (kitchen equipment) Jefferson Barracks, Mo.	6,456
Matthews Electric Supply Co., Birmingham, Ala.; cable, electric, Brookley Field, Mobile, Ala. ...	5,750
Gerald Mora, Houston; underground magazines at Ellington Field, Houston	29,718

FULL SPEED AHEAD



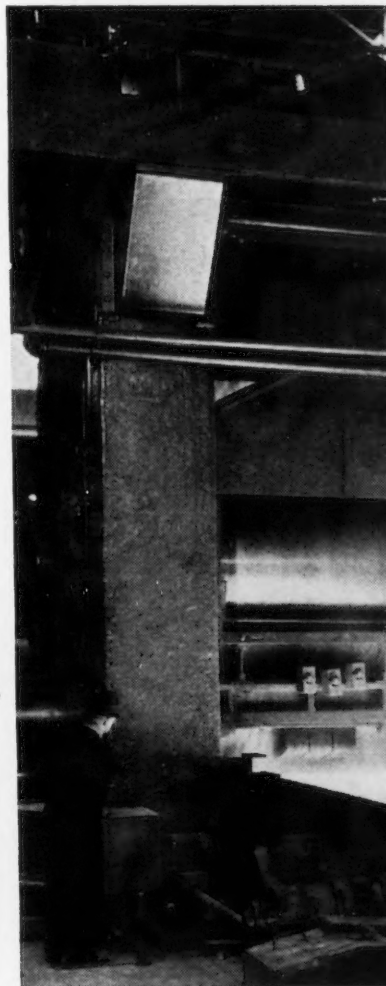
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THERE MUST be no delay in the Nation's gigantic ship-building program. Tanks, and guns, too—these need steel and they need it *fast!*

It's no time to flirt with friction. With every mill being called upon for faster and faster production you can't take a chance on your lubricants. Most steel men — realizing this — count on Penola lubricants to withstand the terrific heats and pressures.

And these lubricants do the job—they're able, in fact, to work under conditions far worse than any found in actual operation! That *extra* toughness explains why *more Penola lubricants are produced and sold to the steel industry than any other make in the world.*

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New York • Chicago • Detroit • St. Louis

LUBRICANTS FOR THE STEEL INDUSTRY SINCE 1885

GOVERNMENT AWARDS

Morris Machine Works, Baldwinsville, N. Y.; pumping station equipment Meadow Hill Pumping Station, East Hartford	5,173
National Mfg. Co., Lincoln, Nebr.; tube swaging machine, Fort Crook, Aircraft Assembly Plant, Nebr.	2,000
Ogden Concrete Pipe Co., Ogden, Utah; reinforced concrete pipe, Hill Field, Ogden, Utah	12,809
Arthur J. O'Leary and Son Co., Chicago; steel pickets and stirrups	2,099
Pacific States Cast Iron Pipe Co., Ironton, Utah; cast iron pipe, bell and spigot, Hill Field, Ogden, Utah	5,622
pipe and fittings, Hill Field	9,013
Pelton Motors, Inc., Los Angeles; panel type trucks, Los Angeles Engineer District	2,469
Fayette R. Plumb, Inc., Philadelphia; hand tools	4,840
Savory, Inc., Newark; electric toasters, Jefferson Barracks, Mo.	4,075
Simplex Wire & Cable Co., Cambridge, Mass.; cable, Air Depot, Middletown, Pa.	6,683
Simpson Construction Co., Chicago; shop and office building, Wright Field, Dayton Ohio	250,000
Smith Booth Usher Co., Los Angeles, Cal.; drill presses, Aircraft Assembly Plant, Tulsa, Okla.	4,780
Wm. A. Smith Construction Co., Inc., Houston; railroad switch tracks at Duncan and Brooks Fields, Texas	30,370

Southwestern Fence Co., Houston; construction of boundary fence at Ellington Field, Houston	18,672
James R. Sutton, New Orleans; structural steel for Control Tower, Lake Charles, La.	3,680
Trailer Co. of America, Cincinnati; semi-trailers and dollies	265,798
Travelcar Corp., Detroit; semi-trailers	73,080
Trewhitt-Shields & Fisher, Fresno, Cal.; A. C. Hangar, Control Tower, Fresno Air Base, Cal.	99,688
Truscon Steel Co., New Orleans; steel windows, Biloxi, Miss.	8,358
Washington Spring Works, Inc., Washington; pumps	3,633
Charles R. Watts & Co., Seattle; fencing, Neah Bay, Wash.	5,830
Well Machinery & Supply Co., Inc., Ft. Worth, Tex.; bench grinders, Aircraft Assembly Plant, Tulsa, Okla.	2,325
drill presses, Tulsa plant	15,472
Wells Manufacturing Co., San Francisco; deep fat fryers, Jefferson Barracks, Mo.	2,471
Wessendorff, Nelms & Co., Inc., Houston; cast iron surface plates and steel stands, Aircraft Assembly Plant, Tulsa, Okla.	2,808
Worthington Pump & Machinery Corp., Harrison, N. J.; pumping station equipment, Meadow Hill Pumping Station, East Hartford, Conn.	39,196
War Dept., Signal Corps:	
Camillus Cutlery Co., Camillus, N. Y.; knives	\$6,197

Continental Electric Co., Inc., Newark; shafts, main	545
Diamond Wire & Cable Co., Chicago Heights; wire	2,022
Electrical Mfg. Co., Lebanon, Pa.; screws	717
Elkay Mfg. Co., Chicago; tanks ..	1,113
General Cable Corp., Perth Amboy, N. J.; cable and reels	1,047
Hubbard & Co., Pittsburgh, Pa.; clamps, cable	1,109
Karp Metal Products Co., Brooklyn; cabinet racks	909
Mathias Klein & Sons Co., Chicago; clamps	52,519
Neumade Products Corp., Buffalo; racks, film separator	732
Rolins Co., New York; winches, hand	6,805
Seyler Mfg. Co., Pittsburgh; clamps	3,907
Super-Steels, Inc., Chicago; axles ..	2,523
A. J. Ulmer, Rutherford, N. J.; lock assemblies	665
cases	1,492
United Transformer Corp., New York; coils	1,632
Utica Drop Forge & Tool Corp., Utica, N. Y.; pliers	10,846
Vulcan Steel Products Co., Brooklyn; mast base brackets	1,800
Western Electric Co., Inc., Chicago; jacks	8,790
Widin Metal Goods Co., Garwood, N. J.; wire pikes	6,934
W. S. Wilson Corp., New York; tools	567

War Dept., Medical:

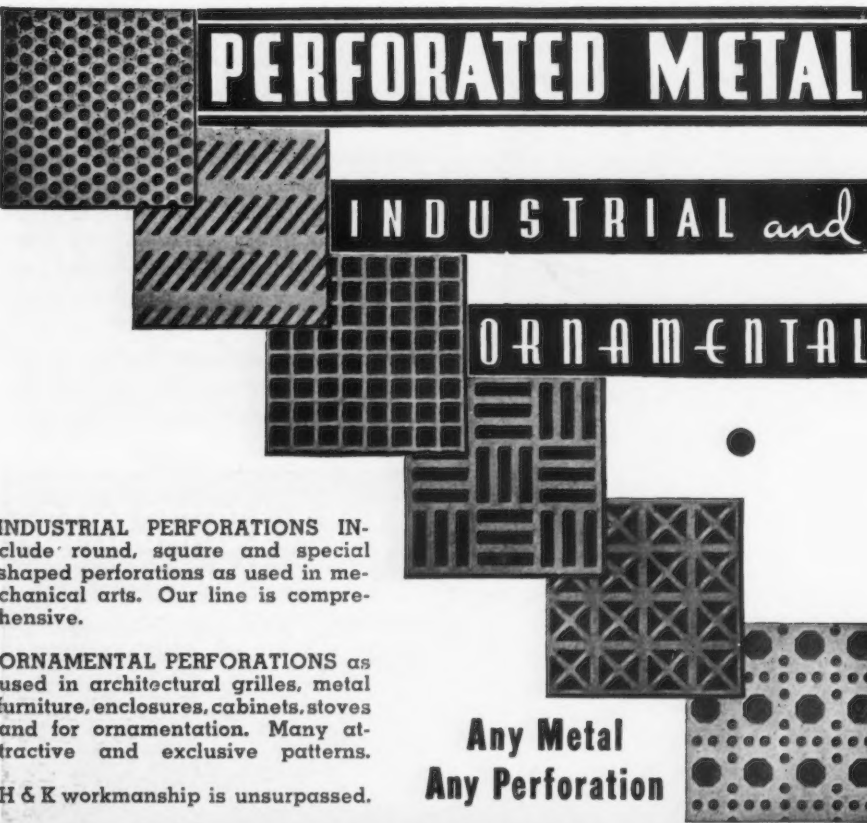
Blue Island Specialty Co., Inc., Blue Island, Ill.; points, carborundum	\$4,312
Fisher Scientific Co., Pittsburgh; vacuum pumps	2,508
Fred Haslam and Co., Inc., New York; surgical instruments	2,273
Legion Utensils Corp., Long Island City, N. Y.; mess equipment ..	16,591
Metal Office Furniture Co., Grand Rapids, Mich.; desks, nurses ...	38,269
Ransom & Randolph Co., Toledo, Ohio; burs	9,103
Scharr & Company, Chicago; copper wire and test tube supports.	4,708
H. W. Schultes, Brooklyn; forceps ..	2,408
Spengler Loomis Mfg. Co., Rockford, Ill.; mess equipment	6,800
S. S. White Dental Mfg. Co., Brooklyn; disks, carborundum, burs, handpieces, forceps & misc. equipment	19,230
Witt Cornice Company, Cincinnati; cans	8,664

War Dept., Quartermaster Corps:

Federal Prison Industries, Inc., Washington; trays, mess	\$110,070
General Motors Sales Corp., Chevrolet Division, Detroit; spare parts for trucks	5,664
Landers, Frary & Clark, New Britain, Conn.; 625,000 each knives ..	73,250
R. Wallace & Sons Mfg. Co., Wallingford, Conn.; forks 625,000 each	23,750
Yellow Truck & Coach Mfg. Co., General Motors Truck & Coach Division, Pontiac, Mich.; assemblies for trucks	4,087

War Dept., Chemical Warfare Service:

Crown Can Co., Philadelphia; chemical container assemblies and bottoms	\$47,371
Eureka Vacuum Cleaner Co., Detroit; eyerings, brass	6,940



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Any Perforation

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GOVERNMENT AWARDS

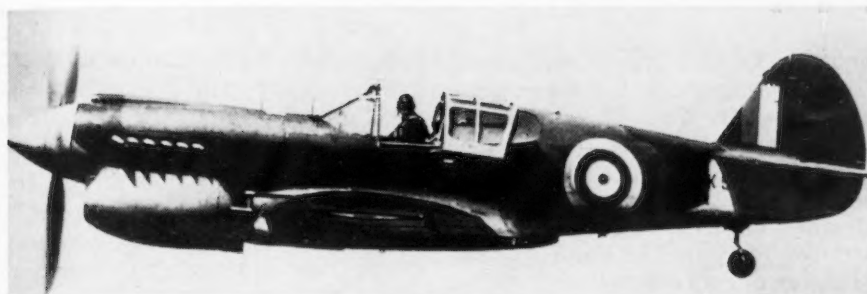


Photo by Wide World

KITTYHAWK: Latest American plane to be built for the RAF is this newly developed Curtiss-Wright Kittyhawk fighter, successor to an earlier type, the Tomahawk. The plane, equipped with a liquid-cooled engine and a 3-bladed propeller, made its first public appearance at dedication of Curtiss-Wright's new \$18,000,000 plant at Buffalo.

National Stamping Co., Detroit; diaphragm angletubes	64,050
O'Sullivan Rubber Co., Inc., Hagerstown, Md.; outlet valves.	40,128
Wackman Welded Ware Co., Chester, Pa.; galvanized drums	18,748
Gar Wood Industries, Inc., Washington; cranes and truck bodies	31,980
War Dept., Coast Artillery Corps:	
General Cable Corp., Philadelphia; wire	\$3,875

Defense Plant Building:

Detroit Tap & Tool Co., Hamtramck, Mich.; machinery and equipment for mfg. gages	\$175,000
T. L. James & Co., Inc., Ruston, La.; advanced single engine flying school, Lake Charles, La....	1,604,236
Frank Messer & Sons, Inc., Cincinnati; Signal Corps storage depot, Avon, Ky.	2,036,500
J. M. Service Corp., New York; Kansas Ordnance Plant, Parsons, Kans.	27,111,620

Exhaust Duct Flareback Starts Magnesium Fire

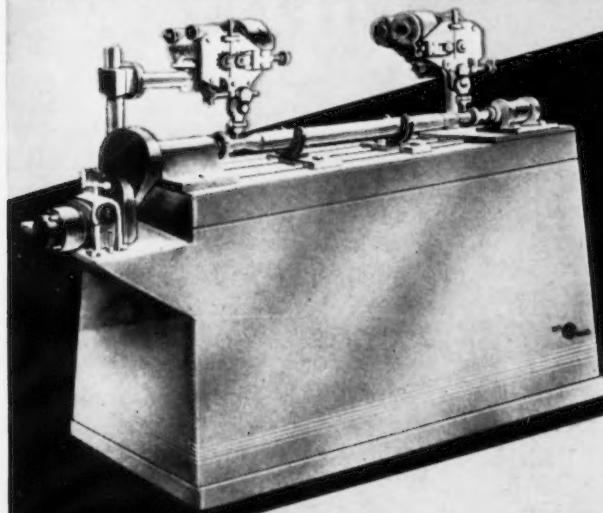
Paterson, N. J.

••• A flareback in an exhaust duct in the cleaning department of the magnesium foundry of Wright Aeronautical Corp., at nearby Fairlawn, severely burned four workmen last week. Six other workmen were also burned but were able to return to the plant immediately after medical treatment.

This is the first important magnesium fire at the Fairlawn foundry, the world's largest magnesium foundry, which is devoted entirely to aircraft part production. The fire apparently occurred at a band-saw bench where gates are removed and then traveled through the dust exhausting system to other nearby benches.

(A description of the new Wright Aeronautical Corp. magnesium foundry at Fairlawn, N. J., appears on page 39.)

UNAMATIC PROCESS LATHE TYPE FIXTURE



for lower costs on special applications

This lathe type fixture with its two Unamatic heads is welding torque tubes for automobiles at a high rate of production. Automatic loading and unloading provides still further increases in the production of automotive parts.

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AND STAINLESS STEELS, ALLOYS
AND NON-FERROUS METALS



BETTER — AND FROM
3 TO 4 TIMES FASTER
THAN MANUAL WELDING

PERSONALS . . .

• **D. G. Baxter** has been appointed general superintendent in charge of Copperweld Steel Co.'s Warren, Ohio, plant. A graduate of Ohio Northern University, Mr. Baxter had been previously associated with American Steel & Wire Co., Pittsburgh Crucible Division, Crucible Steel Co. of America, Inc., Republic Steel Corp. and the National Tube Co.

• **Charles F. Hammond**, for 22 years chief metallurgist of the Winchester Repeating Arms Co., New Haven, Conn., and more recently superintendent of the cartridge division, has resigned to become assistant to the president of the A. F. Holden Co., New Haven, Conn.

• **Howard J. Mullin**, heretofore assistant to the sales manager at Kansas City, has been appointed assistant to manager of sales of the Carnegie-Illinois Steel Corp., Pittsburgh, with headquarters in Detroit. In 1927, after his graduation from Dartmouth College, he joined a subsidiary of the United States Steel Corp. as a sales apprentice with the Illinois Steel Co. From that time on, he has held various sales positions for Carnegie-Illinois.

• **George Brouwer**, former vice-president of the National Piston Ring Co., has been named superintendent and production manager for the Ramsey Mfg. Co. which has taken over a piston ring plant at Fruitport, Mich.

• **William R. Tyler**, manager of service stock for Sealed Power Corp. in Muskegon, Mich., has been appointed personnel director of the concern.

• **Wendell Lund**, secretary of the State Administrative Board, has been appointed director of the Michigan Unemployment Compensation Commission to replace **V. B. Steinbaugh** who has resigned to become official representative of the State at Washington, D. C.

• **Alex Taub**, designer and development engineer for Vauxhall, Ltd., British subsidiary of General Motors Corp., has been appointed by the Office of Production Management to assist the automobile

industry in shifting its facilities from passenger car to defense production. Mr. Taub has been recently connected with the British Purchasing Commission on a special mission in connection with aircraft engines. Previously, he was for 12 years the chief engine designer for Chevrolet.

• **A. W. Lines**, president of the Accuralite Co., Muskegon, Mich., a division of Sealed Power Corp., has been elected a director of that company.

• **Palmer E. Hanson**, secretary of the Milwaukee Automotive Trades, Inc., for the last 12 years and manager of the annual Milwaukee automobile show, has been made assistant to the works manager of the Mack Motor Co., New Brunswick, N. J. He will be active in the foundry department. Mr. Hanson was superintendent of the Buick Motor Co. foundries at Flint, Mich., and subsequently was with the Lackie Foundry at Muskegon, before going to Milwaukee.

• **Richard S. Falk**, director of the apprenticeship program at the Falk Corp., Milwaukee, has been named chairman of apprenticeship training for the Wisconsin chapter of the American Foundrymen's Association. Mr. Falk succeeds William Watson of the Allis-Chalmers Mfg. Co.

• **Herbert E. Smith**, vice-president of Vulcan Rivet & Bolt Corp., Inc., Birmingham, has been elected president by the company's directors. Mr. Smith was appointed vice-president and placed in charge of the firm in July, 1940, following the death of the president, W. C. Martin. From 1917 to 1935, Mr. Smith was secretary of Woodward Iron Co.

• **Jay L. Hench**, who has been vice-president of the Hillside Fluor Spar Mines since 1922, has been elected president and treasurer by the board of directors to succeed the late George H. Jones.

• **Adam L. Wesner**, formerly associated with the United States Bureau of Mines, has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to the

division of materials beneficiation to investigate coal laundering and ore dressing methods. Mr. Wesner is a graduate of the Case School of Applied Science.

• **William H. McKenna** has been appointed assistant to the president, Hanlon-Gregory Galvanizing Co., Pittsburgh.

• **George H. Criss** has been appointed Pittsburgh district representative of the Baker Industrial Truck division of the Baker-Raulang Co., Cleveland. Before selling industrial trucks, Mr. Criss was connected with the Westinghouse Electric & Mfg. Co., Pittsburgh.

• **E. B. Miller**, heretofore of the Chicago staff of the Foxboro Co., Foxboro, Mass., has been named manager of the St. Louis offices of that company. **E. R. Huckman**, former manager of the St. Louis office, has been transferred to New York.

• **S. A. Harris** has been appointed Eastern regional manager of the Detroit Rex Products Co., Detroit. **W. F. Newberry**, who had been in charge of the Eastern region, has been transferred to the general office at Detroit.

OBITUARY...

• **Thomas J. Sayers**, 63 years old, died in Veterans' Hospital, Hines, Ill., recently. Mr. Sayers, born in Jeddo, Pa., came to Detroit in 1911 as president of Acme Products Co., a tool manufacturing concern. In 1920 he joined Ford Motor Co. and remained with the company until he became ill last February.

• **Walter R. Bamford**, service director of Dodge Division, Chrysler Corp., died August 2, aged 56 years. He had been associated with the Oldsmobile, Chalmers, Hupmobile, Maxwell and Fulton Truck companies.

• **M. B. Murray**, 79 years old, who retired in 1939 as secretary of the Albion Malleable Iron Co., died Aug. 10 in St. Petersburg, Fla.

• **Andrew Bostick**, 65 years old, son of the founder of the Bostick Foundry, Lapeer, Mich., died recently.

May Steel Exports Total 472,734 Tons

IMPORTS

EXPORTS

May		Five Months Ended May			May		Five Months Ended May		
1941	1940	1941	1940		1941	1940	1941	1940	
9	6,848	1,692	12,995	Pig iron	27,444	23,606	268,822	98,421	
926	769	1,281	1,205	Ferromanganese and Spiegeleisen ¹	174	3,431	1,807	9,320	
			190	Ferrochrome and ferrosilicon ¹					
			609	Other ferroalloys ¹	2,104	759	11,682	2,770	
3,758	33	10,420	1,259	Sponge iron	62,894	310,870	356,862	1,161,123	
4,693	7,967	13,416	21,390	Scrap: iron, steel, tin plate	92,616	338,666	639,173	1,271,634	
	3	55	409	Pig iron, ferroalloys and scrap	58,900	129,304	573,125	413,717	
				Ingots, blooms, billets, sheet bars	30,817	3,960	198,810	5,683	
			91	Skelp	15,357	4,799	66,927	20,131	
			3,848	Wire rods	11,077	16,796	55,602	74,380	
	3	146	4,257	Semi-finished steel	116,151	154,859	894,464	516,911	
1	15	18	80	Sheets, black iron and steel ²	33,552	33,838	173,222	192,086	
				Sheets, galvanized iron and steel	8,826	11,711	48,526	74,058	
				Sheets, alloy steel	1,816	308	5,474	3,059	
				Sheets, stainless	74	62	469	828	
1	2	7	6	Plates, plain and fabricated	26,464	37,581	195,782	175,766	
				Plates, alloy	899	301	2,370	1,224	
				Plates, stainless	8	25	151	129	
14	82	122	1,645	Bars, merchant and reinforcing	35,274	47,999	226,007	239,121	
	5	15	194	Bars, iron ³	263	471	1,705	7,000	
				Bars, alloy steel	8,277	2,805	30,391	11,621	
				Bars, stainless	34	156	283	517	
				Bars, hollow steel					
27	31	153	785	Hoops, bands, strips, cotton ties	11,106	12,205	64,262	73,383	
	30		601	Hoops, bands, strip: alloy steel	170	74	559	407	
				Hoops, bands, strip: stainless	35	45	220	314	
				Piling, sheet	137	1,009	3,589	3,765	
	107	40	687	Structural shapes	17,356	15,766	126,387	79,918	
20		87		Structural material, fabricated ⁴	5,133	7,023	28,634	30,148	
7	14	45	51	Tin plate,terne plate, taggers' tin	20,157	30,264	89,461	233,603	
				Tanks, steel	1,836	1,477	10,577	11,648	
				Pipe, welded iron and steel	15,950	7,464	61,376	42,458	
36	91	544	1,873	Casing and oil line pipe	13,974	14,724	51,634	89,177	
				Boiler tubes	4,509	1,604	22,890	9,827	
3	1	27	768	Wire, round iron and steel, telephone	6,445	5,991	27,937	35,512	
7	50	78	370	Wire rope, strand, other products	1,799	1,143	7,284	4,909	
			44	Wire barbed, woven products	7,028	4,300	26,710	15,143	
149	61	1,271	1,256	Wire flat, all other types	11,850	10,534	50,931	51,315	
1	12	12	95	Nails, tacks and staples	1,076	637	4,719	2,648	
2	20	16	121	Bolts, nuts, rivets, washers, etc.	3,320	1,496	17,124	6,241	
642	44	1,275	354	Rails and track material	8,136	19,193	82,493	62,565	
1	1	1	12	Die blocks or blanks, etc.					
			3	All other finished steel	2,316	1,345	15,286	8,529	
911	566	3,711	8,945	Rolled and finished steel	247,820	271,551	1,376,453	1,467,819	
			419	Cast iron pipe and fittings	7,499	11,774	27,456	28,524	
			2	Malleable iron pipe fittings	531	291	2,170	2,032	
29	46	138	353	Castings, forgings: iron and steel	5,714	2,531	25,087	12,408	
				Castings, forgings: alloy and stainless	449	732	3,010	2,570	
				Carwheels and axles	1,954	1,318	7,050	6,987	
29	46	138	774	Castings and forgings	16,147	16,646	64,773	52,521	
5,633	8,582	17,411	35,366	Total	472,734	781,722	2,974,863	3,308,885	

¹In imports the tonnage shown is the alloy content; the manganese, chromium and silicon content, as the case may be. ²Imports include skelp and saw plate. ³Import figure included iron slabs. ⁴Imports include sashes and frames only.

* No separate figures.

IMPORTS

May, 1941

(In Gross Tons)

Pig iron	None
Iron ore	179,601
Canada	36,580
Mexico	221
Cuba	11,300
Brazil	10,700
Chile	120,800
Manganese ore—(35 per cent and over)	52,853
Battery grade	269
Mexico	75
Netherlands Indies	294
Other	52,484
Russia	4,624
Mexico	64
Cuba	12,671
Brazil	7,150
Chile	140
Netherlands Indies	286
British India	14,164
Philippine Islands	3,767
Union of South Africa	1,688
Gold Coast of Africa	7,930

Arnold Gives Green Light to Defense Product Simplification

Washington

••• The Justice Department's anti-trust division last week gave business the green light on taking joint action to simplify lines and standardize products for defense under the sponsorship of the National Bureau of Standards.

Answering a letter from Commerce Department Undersecretary Wayne C. Taylor, who wrote that some manufacturers are fearful that concerted action to reduce the number of types and sizes under the defense program would

run afoul of the anti-trust laws, Assistant Attorney General Thurman Arnold replied:

"I understand from your plan of procedure that simplification and standardization proposals will originate with defense agencies, the Department of Commerce and Industry, and that conferences will be held with representatives of specific industries and interested government agencies to obtain advice and information on particular proposals.

"In my view, continued adherence to the specific purpose of simplification will not raise any questions under the Federal anti-trust laws."

CONSTRUCTION STEEL

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings drop to 23,235 tons from 32,800 tons last week; new projects higher at 38,125 tons; plate awards total 1300 tons.

AWARDS

NORTH ATLANTIC STATES

1825 Tons, Rome, N. Y., depot supply building No. 1, to Bethlehem Steel Co., Bethlehem, Pa.

555 Tons, New York, reconstruction track stringers for Manhattan Bridge, to American Bridge Co., Pittsburgh.

475 Tons, Fairfield, Me., State Wyman Crossing, to American Bridge Co., Pittsburgh.

200 Tons, North Tonawanda, N. Y., building for Buffalo Bolt Co., to Buffalo Structural Steel Co., Buffalo.

180 Tons, Brooklyn, sub-stations and signal tower, to Harris Structural Steel Co., Plainfield, N. J.

100 Tons, North Tonawanda, N. Y., building for Durez Plastics & Chemicals, Inc., to R. S. McMannus Steel Construction Co., Inc., Buffalo.

THE SOUTH

565 Tons, Green Cove Spring, Fla., government landplane hangar, to Ingalls Iron Works Co., Birmingham.

434 Tons, Louisville, Ky., PVC plant for B. F. Goodrich Co., to Mississippi Valley Structural Steel Co., St. Louis.

400 Tons, Mulberry, Fla., recovery unit for Phosphate Recovery Corp., to Ingalls Iron Works Co., Birmingham.

210 Tons, Mobile, Ala., ore unloader for Alabama Docks Commission, to Ingalls Iron Works Co., Birmingham.

120 Tons, South Park, Ky., State bridge over Pond Creek, to American Bridge Co., Pittsburgh.

CENTRAL STATES

11,000 Tons, Wichita, Kan., Boeing Airplane Co. assembly building, to American Bridge Co., Pittsburgh.

2560 Tons, Chicago, south district filtering buildings for city, to American Bridge Co., Pittsburgh.

1400 Tons, Venice, Ill., fourth portion Union Electric Power Plant, to Stupp Brothers Bridge & Iron Co., St. Louis.

500 Tons, Sauk Rapids, Minn., State bridge, to American Bridge Co., Pittsburgh.

325 Tons, East Dubuque, Ill., bridge for Illinois Central Railroad, to American Bridge Co., Pittsburgh.

250 Tons, Cleveland, crane runway for Wellman Engineering Co., to Berger Iron Works, Akron, Ohio.

140 Tons, Kingsbury, Ind., detonator line boiler house for federal government, to American Bridge Co., Pittsburgh.

110 Tons, Hurley, Wis., gymnasium addition, Lincoln High School, for board of education to American Bridge Co., Pittsburgh.

WESTERN STATES

850 Tons, Oakland, Cal., two dry provision warehouses, Naval Supply Depot, to American Bridge Co., Pittsburgh.

512 Tons, Victorville, Cal., 4 air corps hangars, to Pacific Iron & Steel Co., Los Angeles.

384 Tons, Mesa, Ariz., 3 air corps hangars, to Allison Steel Mfg. Co., Phoenix, Ariz.

260 Tons, North Hollywood, Cal., Bendix Aviation, Ltd., plant, to Consolidated Steel Corp., Los Angeles.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

7300 Tons, Brooklyn Navy Yard, sub-assembly shop; Contractors for Drydocks, New York, contractors.

2500 Tons, Tonawanda Township, N. Y., airplane testing building for Chevrolet-Buffalo division, General Motors, Inc. (Originally reported at 1000 tons.)

1500 Tons, Hagerstown, Md., factory addition for Fairchild Engine & Aircraft Corp., Fairfield Aircraft Division.

1400 Tons, North Bergen, N. J., factory for Grand City Container Co.

900 Tons, Clearfield, Pa., factory for Harbison-Walker Refractories.

700 Tons, Queens, N. Y., grade separation bridges, 30th-32nd Streets.

360 Tons, Newark, St. Michael's Hospital; Thomas J. Hughes, New York, contractor.

350 Tons, Kendaia, N. Y., six buildings, Seneca Ordnance Depot, for War Department.

350 Tons, Schenectady, N. Y., Army storage building.

250 Tons, Harpursville, N. Y., bridge alterations, for Delaware & Hudson Railroad.

200 Tons, Warrensville, N. Y., State bridge RC-41-38.

175 Tons, Washington, South Capitol Street bridges for District of Columbia.

160 Tons, Haverstraw, N. Y., grade crossing elimination, P. S. C. 6622, bids due Sept. 4.

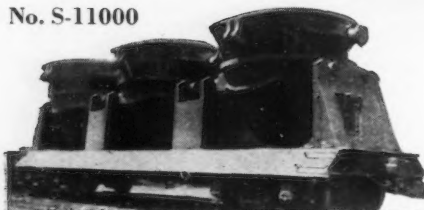
150 Tons, Jessup, Md., State highway bridge over Baltimore & Ohio Railroad.

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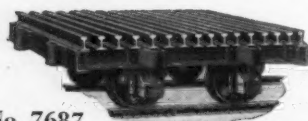
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PRESSED STEEL CAR CO., INC.
(KOPPEL DIVISION)
PITTSBURGH, PA.

CONSTRUCTION STEEL

THE SOUTH

- 3300 Tons, Gilbertsville, Ky., 25 spillway gates, Kentucky Dam, for TVA.
600 Tons, Gilbertsville, Ky., bulkhead frames and tubes, Kentucky Dam, for TVA.

CENTRAL STATES

- 5000 Tons, Cleveland, buildings for Thompson Aircraft, Inc.
800 Tons, Alliance, Ohio, building for American Steel Foundries Co.; bids in.
375 Tons, Ironwood, Mich., shaft sets, Penokee Mine, for Republic Steel Corp.
225 Tons, Chicago, crane runways and building addition for John Wood Mfg. Co.
140 Tons, La Porte, Ind., boiler house, Kingsbury Ordnance, for U. S. Govt.

WESTERN STATES

- 8500 Tons, Sunnyvale, Cal., Moffett Field wind tunnel; Pittsburgh-Des Moines Steel Co., San Francisco, low bidder.
1200 to 1500 Tons, Burbank, Cal., Lockheed Aircraft Corp. assembly building.
1000 Tons, Los Angeles, Figueroa Street bridge and overpass superstructure; re-bid Sept. 4.
700 Tons, Santa Monica, Cal., Douglas Aircraft Corp. storage buildings.
500 Tons, Los Angeles, miscellaneous steel, outfitting dock for Consolidated Steel Corp.; Raymond Concrete Pile Co., Los Angeles, contractor.
500 Tons, Earp, Cal., roof framing, Parker Power Plant No. 1540-D, for U. S. Bureau of Reclamation.

BRAZIL

- 7500 Tons, Brazil, openhearth for new steel plant.

FABRICATED PLATES

AWARDS

- 1178 Tons, Paducah, Ky., four oil barges for Illinois Oil Co., to Ingalls Shipbuilding Corp., Decatur, Ala.
121 Tons, Galveston, Tex., welded steel barge for U. S. Engineers, to Ingalls Shipbuilding Corp., Decatur, Ala.

PENDING

- 2500 Tons, Sunnyvale, Cal., Moffett Field wind tunnel; Pittsburgh-Des Moines Steel Co., San Francisco, low bidder.

Reinforcing Steel

Awards of 15,590 tons; 22,420 tons in new projects.

AWARDS

ATLANTIC STATES

- 660 Tons, bars and mesh, Fort Devans, Mass., camp improvements. Bars to Bethlehem Steel Co., Bethlehem, Pa., and mesh to Truseon Steel Co., Boston.
300 Tons, Washington, recorder of deeds office building to Bethlehem Steel Co., Bethlehem, Pa.; Jeffries-Dyer, Inc., contractor.
100 Tons, Syracuse, N. Y., field artillery armory, to Bethlehem Steel Co., Bethlehem, Pa.; W. E. Bouley Co., contractor.

SOUTH AND CENTRAL

- 3000 Tons, Des Moines, Iowa, Iowa Ordnance Works, small arms plant; 2000 tons to Inland Steel Co., Chicago; 500 tons to Laclede Steel Corp., St. Louis; 500 tons to Youngstown Sheet & Tube Co., Youngstown, Ohio.
2138 Tons, New Orleans, La., Army embarkment wharf, to Jones & Laughlin Steel Corp., Pittsburgh; Miller Hutchinson, contractor.
2000 Tons, Burns City, Ind., Naval ordnance plant addition to Inland Steel Co., Chicago; Maxon Construction Co., contractor.
1000 Tons, Dearborn, Mich., Ford Motor Co. plane assembly plant extension, to Bethlehem Steel Co., Bethlehem, Pa.; Bryant & Detwiler, contractor.
1000 Tons, Wichita, Kan., Boeing Airplane Co. plant, divided between Sheffield Steel Corp., Kansas City, and Colorado Fuel & Iron Co., Denver.
950 Tons, Huntington, W. Va., river wall, local protection project No. 3, to Jones & Laughlin Steel Corp., Pittsburgh; Midwest Construction & Asphalt Co., Chicago, contractor.

Weekly Bookings of Construction Steel

Week Ended	Aug. 19, 1941	Aug. 12, 1941	July 22, 1941	Aug. 20, 1940	Year to Date	
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards	23,235	32,880	39,950	22,000	934,145	587,425
Fabricated plate awards	1,300	0	4,400	10,250	95,765	104,625
Steel sheet piling awards	0	0	345	280	20,630	30,840
Reinforcing bar awards	15,590	8,440	5,650	10,440	410,595	291,300
Total Letting of Construction Steel	40,125	41,320	50,345	42,970	1,461,135	1,014,190

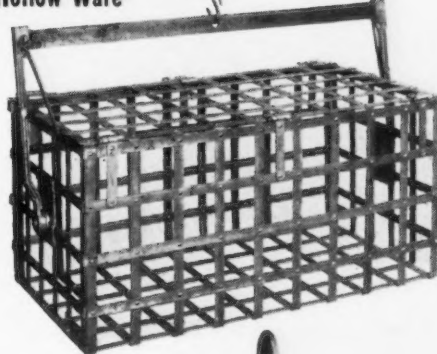
900 Tons, Wright Field, Ohio, propeller laboratory and test stand, to Pollak Steel Co., Cincinnati; Ferro Concrete Construction Co.

600 Tons, Chicago, Commonwealth Edison Co. Fisk St. station, to Joseph T. Ryerson & Son, Inc., Chicago.

300 Tons, Patterson Field, Ohio, army air

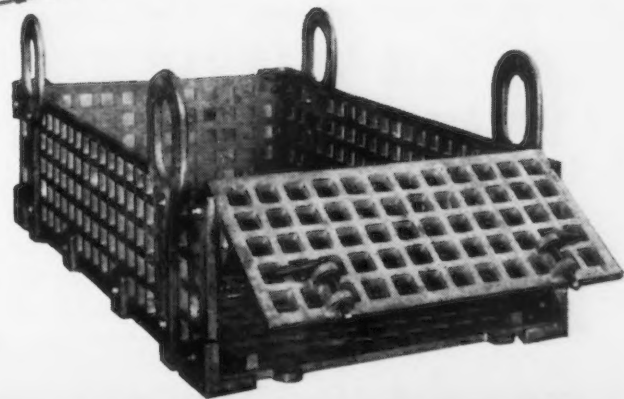
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Revolving Basket for Hollow Ware



These Super or Stainless B & M Metal Pickling Baskets are first choice of those who pickle hollow ware and heavy forgings.

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For Heavy Forgings Open End Type

WHEELING BRONZE CASTING CO.



WHEELING, W. VA.

CONSTRUCTION STEEL

- corps storage buildings, to Pollak Steel Co., Cincinnati.
- 200 Tons, Ypsilanti, Mich., Ford Motor Co. bomber plant power station, to Bethlehem Steel Co., Bethlehem, Pa.; Bryant & Detwiler, contractor.
- 133 Tons, Richland County, Ohio, State project, to Carnegie-Illinois Steel Corp., Pittsburgh.
- 125 Tons, Montgomery, Ala., welded steel fabric for U. S. Army Air Corps construction at Maxwell Field, to Truscon Steel Co., Birmingham.
- 125 Tons, Stephens County, Tex., State highway, to North Texas Iron & Steel Co., Fort Worth, Tex.
- 119 Tons, McCullough County, Tex., State highway to North Texas Iron & Steel Co., Fort Worth, Tex.

- 118 Tons, Ironton, Ohio, flood wall, north unit, to Jones & Laughlin Steel Corp., Pittsburgh, through Ben-Tom Supply Co., Columbus, Ohio; Lewis & Frisinger Co., contractor.
- 113 Tons, Oberlin, Ohio, physics building for Oberlin College, to Hausmann Steel Co., Toledo.
- 100 Tons, Biloxi, Miss., U. S. training school for aviation mechanics, to Truscon Steel Co., Birmingham.
- 100 Tons, Akron, Ohio, gun mount plant for Firestone Rubber Co., to Franklin Steel Co., Franklin, Pa.

WESTERN STATES

- 173 Tons, Kamiah, Idaho, Clearwater River bridge, to Bethlehem Steel Co., Bethlehem, Pa., through J. F. Konen, Lewiston, Idaho, contractor.

- 132 Tons, Stanfield, Ore., Umatilla River overcrossing, to Poole & McGonigle, Portland, through C. J. Montag & Sons, Portland, Ore., contractor.

BRITISH WEST INDIES

- 1200 Tons, Antigua, B. W. L. Army base, to Jones & Laughlin Steel Corp., Pittsburgh; S. J. Grove & Sons, contractor.

Pipe Lines

• Texas Pipe Line Co., 720 San Jacinto Street, Houston, Tex., and Philtower Building, Tulsa, Okla., plans new 6- and 8-in. welded steel pipe line from oil field area at Apache, Caddo County, Okla., to Seminole, Okla., by way of oil field district at Cement, Caddo County, with which connection will be made, about 100 miles in all, for crude oil transmission. New line will connect with present main transmission line at Seminole. Booster pumping stations and other facilities will be installed to provide capacity of about 25,000 bbl. per day. Cost over \$650,000. Company is affiliated with Texas Co., first noted address.

Hope Natural Gas Co., Union Trust Building, Charleston, W. Va., plans new 20-in. welded steel pipe line from gas field area at Monroe, La., to connection with main pipe line system in West Virginia, for natural gas transmission, augmenting present supply from West Virginia and Kentucky fields. Estimates of cost are being made.

Long Beach, Cal., has awarded contract to Southern Pipe & Casing Co., Azusa, Cal., for 7512 lin. ft. of welded steel pipe, at \$21,275.26.

Verona, Ohio, plans pressure pipe line system for municipal gas distribution, with operating facilities. Cost reported close to \$75,000. Proposed to begin work soon.

Shell Oil Co., Los Angeles, has awarded approximately 9000 tons of 10-in. pipe, divided equally between Youngstown Sheet & Tube Co. and National Tube Co., for oil pipe line from Ventura, Cal., to Wilmington, Cal.

Cast Iron Pipe

• Metropolitan District Board of Contract and Supply, Municipal Building, Hartford, Conn., asks bids until Aug. 25 for about 34 tons of cement-lined pit cast iron pipe, 24 to 42-in. diameter; about 12½ tons of cement-lined fittings, and approximately three tons of unlined fittings (Contract 71); about 20,500 lin. ft. of cement-lined centrifugal cast iron pipe, 8 to 24-in. diameter; six tons of cement-lined fittings, and about 12 tons of unlined fittings (Contract 72); about 212 tons of cement-lined pit cast iron pipe, 30, 36 and 42-in. diameter; about 13 tons of cement-lined fittings, and about one ton of unlined fittings (Contract 74); three gate valves, 24, 30 and 36-in., respectively (Contract 70). (Proposals from manufacturers only will be considered.)

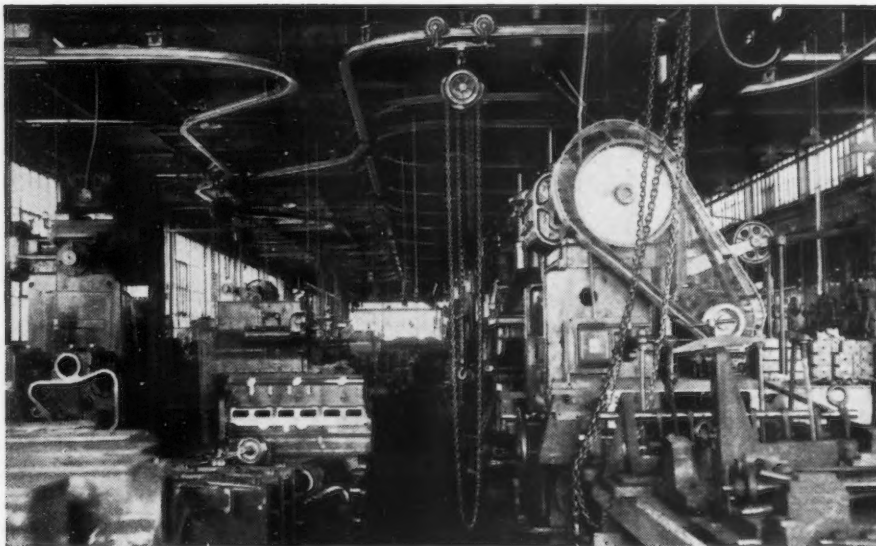
San Francisco has awarded 10,000 ft. of 4-in., 40,000 ft. of 6-in., 5000 ft. of 12-in., and 4000 ft. of 16-in. pipe to United States Pipe & Foundry Co., San Francisco.

East Bay Municipal Utility District, Oakland, Cal., has awarded 100,000 ft. of 4-in., 150,000 ft. of 6-in., and 50,000 ft. of 8-in. to United States Pipe & Foundry Co., San Francisco.

Seattle has opened bids on 7500 ft. of Class 150 pipe under Ord. 69839.

PENDING REINFORCING BAR PROJECTS ATLANTIC STATES

- 5000 Tons, Queens, N. Y., Borough of Queens, sewer.
- 600 Tons, Washington, Potomac Electric Power Co. works; Stone & Webster, contractor.
- 600 Tons, North Hempstead, N. Y., Sperry Gyroscope factory; Stone & Webster, contractor.
- 400 Tons, Hartford, Conn., Connecticut River flood control dike; A. I. Savin Construction Co., contractor.



Courtesy The Cummins Engine Co.

WHERE MACHINES ARE HIGH AND HEADROOM LOW — A TRAMRAIL SYSTEM THAT GIVES COMPLETE COVERAGE

This overhead materials handling system at The Cummins Engine Co., Columbus, Indiana, illustrates the extreme flexibility of Cleveland Tramrail. Despite the height of machines and low headroom this rail system makes it possible to deliver materials between machines or departments without rehandling.

This system was started in 1932 with a few pieces of rail, a switch, and a chain hoist. Because of satisfactory performance and plant expansion it has gradually been extended and now is an extensive system with hundreds of chain hoists, carriers and switches, serving the machine shop, assembly, shipping and storage departments.

Whatever your materials handling problem, it is wise to consult with a Cleveland Tramrail materials handling engineer.



CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Other products: CLEVELAND CRANES and STEELWELD MACHINERY

PD-69:

Below are American Iron and Steel Institute pig iron specifications which must be used on Aug. 20 and after, according

to the OPM, by all pig iron users in filling out form PD-69. Column marked "Grade Designation" should be used.

Table A—Low Phosphorus

Grade Designation	Composition, per cent			
	Si	S Max.	P Max.	Mn
A 063075m	0.50/0.75	0.035	0.035	0.75 max.
A 08075m	0.76/1.00	0.035	0.035	0.75 max.
A 113075m	1.00/1.25	0.035	0.035	0.75 max.
A 138075m	1.26/1.50	0.035	0.035	0.75 max.
A 163075m	1.51/1.75	0.035	0.035	0.75 max.
A 188075m	1.76/2.00	0.035	0.035	0.75 max.
A 213075m	2.01/2.25	0.035	0.035	0.75 max.
A 238075m	2.26/2.50	0.035	0.035	0.75 max.
A 263075m	2.51/2.75	0.035	0.035	0.75 max.
A 288075m	2.76/3.00	0.035	0.035	0.75 max.
A 113088	1.00/1.25	0.035	0.035	0.76/1.00
A 138088	1.26/1.50	0.035	0.035	0.76/1.00
A 163088	1.51/1.75	0.035	0.035	0.76/1.00
A 188088	1.76/2.00	0.035	0.035	0.76/1.00
A 213088	2.01/2.25	0.035	0.035	0.76/1.00
A 238088	2.26/2.50	0.035	0.035	0.76/1.00
A 263088	2.51/2.75	0.035	0.035	0.76/1.00
A 288088	2.76/3.00	0.035	0.035	0.76/1.00
A 113113	1.00/1.25	0.035	0.035	1.01/1.25
A 138113	1.26/1.50	0.035	0.035	1.01/1.25
A 163113	1.51/1.75	0.035	0.035	1.01/1.25
A 188113	1.76/2.00	0.035	0.035	1.01/1.25
A 213113	2.01/2.25	0.035	0.035	1.01/1.25
A 238113	2.26/2.50	0.035	0.035	1.01/1.25
A 263113	2.51/2.75	0.035	0.035	1.01/1.25
A 288113	2.76/3.00	0.035	0.035	1.01/1.25

Table B—Intermediate Low Phos.

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
B 113075m	1.00/1.25	0.05	0.036/0.075	0.75 max.
B 138075m	1.26/1.50	0.05	0.036/0.075	0.75 max.
B 163075m	1.51/1.75	0.05	0.036/0.075	0.75 max.
B 188075m	1.76/2.00	0.05	0.036/0.075	0.75 max.
B 213075m	2.01/2.25	0.05	0.036/0.075	0.75 max.
B 238075m	2.26/2.50	0.05	0.036/0.075	0.75 max.
B 263075m	2.51/2.75	0.05	0.036/0.075	0.75 max.
B 288075m	2.76/3.00	0.05	0.036/0.075	0.75 max.
B 113088	1.00/1.25	0.05	0.036/0.075	0.76/1.00
B 138088	1.26/1.50	0.05	0.036/0.075	0.76/1.00
B 163088	1.51/1.75	0.05	0.036/0.075	0.76/1.00
B 188088	1.76/2.00	0.05	0.036/0.075	0.76/1.00
B 213088	2.01/2.25	0.05	0.036/0.075	0.76/1.00
B 238088	2.26/2.50	0.05	0.036/0.075	0.76/1.00
B 263088	2.51/2.75	0.05	0.036/0.075	0.76/1.00
B 288088	2.76/3.00	0.05	0.036/0.075	0.76/1.00
B 113113	1.00/1.25	0.05	0.036/0.075	1.01/1.25
B 138113	1.26/1.50	0.05	0.036/0.075	1.01/1.25
B 163113	1.51/1.75	0.05	0.036/0.075	1.01/1.25
B 188113	1.76/2.00	0.05	0.036/0.075	1.01/1.25
B 213113	2.01/2.25	0.05	0.036/0.075	1.01/1.25
B 238113	2.26/2.50	0.05	0.036/0.075	1.01/1.25
B 263113	2.51/2.75	0.05	0.036/0.075	1.01/1.25
B 288113	2.76/3.00	0.05	0.036/0.075	1.01/1.25

Table C—Northern Low Phos. Foundry

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
F 175063s	1.75 max.	0.05	0.300/0.500	0.50/0.75
F 188063	1.75/2.00	0.05	0.300/0.500	0.50/0.75
F 213063	2.01/2.25	0.05	0.300/0.500	0.50/0.75
F 238063	2.26/2.50	0.05	0.300/0.500	0.50/0.75
F 263063	2.51/2.75	0.05	0.300/0.500	0.50/0.75
F 288063	2.76/3.00	0.05	0.300/0.500	0.50/0.75
F 313063	3.01/3.25	0.05	0.300/0.500	0.50/0.75
F 338063	3.26/3.50	0.05	0.300/0.500	0.50/0.75
F 363063	3.51/3.75	0.05	0.300/0.500	0.50/0.75
F 388063	3.76/4.00	0.05	0.300/0.500	0.50/0.75
F 413063	4.01/4.25	0.05	0.300/0.500	0.50/0.75
F 438063	4.26/4.50	0.05	0.300/0.500	0.50/0.75
F 463063	4.51/4.75	0.05	0.300/0.500	0.50/0.75
F 488063	4.76/5.00	0.05	0.300/0.500	0.50/0.75
F 175088s	1.75 max.	0.05	0.300/0.500	0.76/1.00
F 188088	1.75/2.00	0.05	0.300/0.500	0.76/1.00
F 213088	2.01/2.25	0.05	0.300/0.500	0.76/1.00
F 238088	2.26/2.50	0.05	0.300/0.500	0.76/1.00
F 263088	2.51/2.75	0.05	0.300/0.500	0.76/1.00
F 288088	2.76/3.00	0.05	0.300/0.500	0.76/1.00
F 313088	3.01/3.25	0.05	0.300/0.500	0.76/1.00
F 338088	3.26/3.50	0.05	0.300/0.500	0.76/1.00
F 363088	3.51/3.75	0.05	0.300/0.500	0.76/1.00
F 388088	3.76/4.00	0.05	0.300/0.500	0.76/1.00
F 413088	4.01/4.25	0.05	0.300/0.500	0.76/1.00
F 438088	4.26/4.50	0.05	0.300/0.500	0.76/1.00
F 463088	4.51/4.75	0.05	0.300/0.500	0.76/1.00
F 488088	4.76/5.00	0.05	0.300/0.500	0.76/1.00
F 175113s	1.75 max.	0.05	0.300/0.500	1.01/1.25
F 188113	1.75/2.00	0.05	0.300/0.500	1.01/1.25
F 213113	2.01/2.25	0.05	0.300/0.500	1.01/1.25
F 238113	2.26/2.50	0.05	0.300/0.500	1.01/1.25
F 263113	2.51/2.75	0.05	0.300/0.500	1.01/1.25
F 288113	2.76/3.00	0.05	0.300/0.500	1.01/1.25
F 313113	3.01/3.25	0.05	0.300/0.500	1.01/1.25
F 338113	3.26/3.50	0.05	0.300/0.500	1.01/1.25
F 363113	3.51/3.75	0.05	0.300/0.500	1.01/1.25
F 388113	3.76/4.00	0.05	0.300/0.500	1.01/1.25
F 413113	4.01/4.25	0.05	0.300/0.500	1.01/1.25
F 438113	4.26/4.50	0.05	0.300/0.500	1.01/1.25
F 463113	4.51/4.75	0.05	0.300/0.500	1.01/1.25
F 488113	4.76/5.00	0.05	0.300/0.500	1.01/1.25

Table D—Malleable

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
D 088063	0.75/1.00	0.05	0.101/0.300	0.50/0.75
D 113063	1.01/1.25	0.05	0.101/0.300	0.50/0.75
D 138063	1.26/1.50	0.05	0.101/0.300	0.50/0.75
D 163063	1.51/1.75	0.05	0.101/0.300	0.50/0.75
D 188063	1.76/2.00	0.05	0.101/0.300	0.50/0.75
D 213063	2.01/2.25	0.05	0.101/0.300	0.50/0.75
D 238063	2.26/2.50	0.05	0.101/0.300	0.50/0.75
D 263063	2.51/2.75	0.05	0.101/0.300	0.50/0.75
D 288063	2.76/3.00	0.05	0.101/0.300	0.50/0.75
D 313063	3.01/3.25	0.05	0.101/0.300	0.50/0.75
D 338063	3.26/3.50	0.05	0.101/0.300	0.50/0.75
D 363063	3.51/3.75	0.05	0.101/0.300	0.50/0.75
D 388063	3.76/4.00	0.05	0.101/0.300	0.50/0.75
D 413063	4.01/4.25	0.05	0.101/0.300	0.50/0.75
D 438063	4.26/4.50	0.05	0.101/0.300	0.50/0.75
D 463063	4.51/4.75	0.05	0.101/0.300	0.50/0.75
D 488063	4.76/5.00	0.05	0.101/0.300	0.50/0.75
D 138088	1.25/1.50	0.05	0.101/0.300	0.76/1.00
D 163088	1.51/1.75	0.05	0.101/0.300	0.76/1.00
D 188088	1.76/2.00	0.05	0.101/0.300	0.76/1.00
D 213088	2.01/2.25	0.05	0.101/0.300	0.76/1.00
D 238088	2.26/2.50	0.05	0.101/0.300	0.76/1.00
D 263088	2.51/2.75	0.05	0.101/0.300	0.76/1.00
D 288088	2.76/3.00	0.05	0.101/0.300	0.76/1.00
D 313088	3.01/3.25	0.05	0.101/0.300	0.76/1.00
D 338088	3.26/3.50	0.05	0.101/0.300	0.76/1.00
D 363088	3.51/3.75	0.05	0.101/0.300	0.76/1.00
D 388088	3.76/4.00	0.05	0.101/0.300	0.76/1.00
D 413088	4.01/4.25	0.05	0.101/0.300	0.76/1.00
D 438088	4.26/4.50	0.05	0.101/0.300	0.76/1.00
D 463088	4.51/4.75	0.05	0.101/0.300	0.76/1.00
D 488088	4.76/5.00	0.05	0.101/0.300	0.76/1.00
D 138113	1.25/1.50	0.05	0.101/0.300	1.01/1.25
D 163113	1.51/1.75	0.05	0.101/0.300	1.01/1.25
D 188113	1.76/2.00	0.05	0.101/0.300	1.01/1.25
D 213113	2.01/2.25	0.05	0.101/0.300	1.01/1.25
D 238113	2.26/2.50	0.05	0.101/0.300	1.01/1.25
D 263113	2.51/2.75	0.05	0.101/0.300	1.01/1.25
D 288113	2.76/3.00	0.05	0.101/0.300	1.01/1.25
D 313113	3.01/3.25	0.05	0.101/0.300	1.01/1.25
D 338113	3.26/3.50	0.05	0.101/0.300	1.01/1.25
D 363113	3.51/3.75	0.05	0.101/0.300	1.01/1.25
D 388113	3.76/4.00	0.05	0.101/0.300	1.01/1.25
D 413113	4.01/4.25	0.05	0.101/0.300	1.01/1.25
D 438113	4.26/4.50	0.05	0.101/0.300	1.01/1.25
D 463113	4.51/4.75	0.05	0.101/0.300	1.01/1.25
D 488113	4.76/5.00	0.05	0.101/0.300	1.01/1.25

Table E—Silvery

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn
S 525075	5.00/5.50	0.05	0.300	0.50/1.00
S 575075	5.51/6.00	0.05	0.300	0.50/1.00
S 625075	6.01/6.50	0.05	0.300	0.50/1.00
S 675075	6.51/7.00	0.05	0.300	0.50/1.00
S 725075	7.01/7.50	0.05	0.300	0.50/1.00
S 775075	7.51/8.00	0.05	0.300	0.50/1.00
S 825075	8.01/8.50	0.05	0.300	0.50/1.00
S 875075	8.51/9.00	0.05	0.300	0.50/1.00
S 925075	9.01/9.50	0.05	0.300	0.50/1.00
S 975075	9.51/10.00	0.05	0.300	0.50/1.00
S 1025075	10.01/10.50	0.05	0.300	0.50/1.00
S 1075075	10.51/11.00	0.05	0.300	0.50/1.00
S 1125075	11.01/11.50	0.05	0.300	0.50/1.00
S 1175075	11.51/12.00	0.05	0.300	0.50/1.00
S 1225075	12.01/12.50	0.05	0.300	0.50/1.00
S 1275075	12.51/13.00	0.05	0.300	0.50/1.00
S 1325075	13.01/13.50	0.05	0.300	0.50/1.00
S 1375075	13.51/14.00	0.05	0.300	0.50/1.00
S 1425075	14.01/14.50	0.05	0.300	0.50/1.00
S 1475075	14.51/15.00	0.05	0.300	0.50/1.00
S 1525075	15.01/15.50	0.05	0.300	0.50/1.00
S 1575075	15.51/16.00	0.05	0.300	0.50/1.00
S 1625075	16.01/16.50	0.05	0.300	0.50/1.00
S 1675075	16.51/17.00	0.05	0.300	0.50/1.00

Table F—Silvery

Grade Designation	Composition, per cent			
	Si	S Max.	P	Mn

MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

August Tool Output Seen Recovering from June Dip

Cleveland

• • • August machine tool output has been regaining some of the ground lost in July due to vacations, delays in receiving materials and confusion over priorities. It is expected that by the end of this month the industry's production will approximate the level of late June. July output showed a definite decline.

The cutting tool problem, which has been coming to the fore increasingly recently with the realization that more cutters will be required next year than ever produced before in this country, was examined at a meeting in Washington last week at which steps toward amplifying and broadening the priority set-up were recommended.

Indicative of the high demand for cutting tools, one eastern aircraft engine company and its two affiliated automotive plants are believed likely to need around \$9,000,000 worth next year. Probably the whole aircraft industry alone

will require \$40,000,000 worth. Another way to visualize the vastness of the problem is to study the production figures of the machine tool industry which is aiming at yearly output of \$750,000,000, equivalent to the output of eight or ten lean years.



All Large Orders Placed

Chicago

• • • Machine tool activity here is following so steady a pattern that it gives the effect of being quiet. This is due to the very defense program which would lead the layman to the belief that those buying and selling machine tools are leading a pretty hectic life.

Actually, practically all the big orders for tools have been placed in this district and either installations have been made or deliveries are on their way. In some cases, a few major defense contractors have been delayed much longer than expected because of failure to get certain types of tools—not-

ably the largest sizes, right now. Manufacturers in the area have practically all been utilizing expanded facilities for some time. This condition has led to a drop in inquiries for new equipment and to concentration on getting delivery or getting installation into actual production.

Service work is at a peak. Because of scarcity of tools, etc., dealers and manufacturers' representatives are bending all efforts to give customers short cuts and tips on production tricks to keep equipment working. Used machinery sales continue to pursue a quiet, orderly flow, filling in where new equipment cannot be obtained. Complaints are still voiced by smaller firms that their orders have been sidetracked for the bigger companies. In Gary, Ind., the Froebel trade school has been authorized to buy 92 machines at a cost of \$67,723.



Some Deliveries Shortened

Cincinnati

• • • With the bomber program still being discussed and fresh bookings brisk, district machinery makers feel that the peak of demand has not yet been passed. Priorities continue to be a "bugbear" to manufacturers, and delivery promises are only relative. In fact, manufacturers indicate that in many instances the exact destination of machines sent through the plant is not determined until they are ready for shipment, because of the constant change in priority ratings. On some types of machines, particularly millers and grinders, delivery dates on new orders are becoming shorter, with some quotations now being made on the basis of October and November deliveries. This is the direct result, of course, of the recent expanded plant capacity, although this has not, on the average, caught up with the tremendous backlog.

Seven Months' Gear Sales 123% Above Year Ago



GEAR BUYING: Sales of industrial gears in the first seven months of the present year are 123 per cent above the comparable period of 1940, the American Gear Manufacturers Association reports. The association's sales index, which excludes automotive and high-speed turbine drive gears, averaged 282 for the January-July period of 1941 against 126 in the corresponding months of a year ago. The index of sales for July stands at 298, against 299 in the previous month.

NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

OPACS Ceiling Set On Tin, Copper Scrap

••• Ceiling prices on virgin tin and copper scrap, threats of an OPACS price schedule for scrap lead, confusion in the copper trade because of the recently announced price schedule, and increased zinc scrap "bootlegging" highlight developments in the non-ferrous market for the past week.

A ceiling price of 52c. a lb. on Grade A pig tin, effective Aug. 16, to "meet the inflationary situation in tin prices created by concern over shipments from the Far East," was announced by OPACS. While fixed prices have been expected in tin circles for the past several weeks, it was believed that the ceiling would be set at 50c. a lb., the price paid for tin by the Metals Reserve Co.

The schedule provides for exemptions, under restrictions, of firm commitments entered into prior to Aug. 16 for sale of pig tin at prices higher than the ceiling. While the schedule does not include prices for special shapes, such as tin bars and anodes, makers are expected to continue to sell at customary and normal premiums over pig tin prices. Price maximums for standard grades of tin, per lb., are:

99.80 per cent or higher purity.....	52c.
99.75 to 99.79 per cent pure.....	51.625c.
Cornish refined tin.....	51.625c.
99 to 99.74 per cent pure.....	51.125c.
Below 99 per cent pure.....	51c.*

*For tin content.

Because scrap copper prices are "completely out of line" with the price of virgin red metal, OPACS imposed a ceiling on the secondary metal, effective Aug. 19, ranging from 2c. to 4c. a lb. below the present 12c. ceiling on refined copper. Ceiling prices in the new schedule are: 10c. a lb. for No. 1 copper wire and No. 1 heavy copper; 9c. a lb. for No. 2 copper wire and mixed heavy copper containing 96 per cent Cu; and 8c. a lb. for light copper containing 92 per cent Cu. These prices apply to sales by makers of scrap, delivered to the buyer's plant, while a uniform $\frac{3}{4}$ c. a lb. margin is allowed to dealers for collecting,

sorting, storing and shipping. A premium of $\frac{1}{2}$ c. a lb. may be charged by brokers on shipments aggregating 40,000 lb. or more made at one time, and a differential of 0.11775c. a lb. may be added to or subtracted from the ceiling prices for each 1 per cent variation above or below the copper content of 96 per cent in the case of the 9c. grades.

OPACS this week indicated that scrap lead prices were too high and hoarding is prevalent. Unless immediate adjustments are made, steps in the form of a price ceiling will be taken to correct these conditions and "the maximum prices imposed will be considerably below the current levels." Meanwhile, an OPM priority order on all lead is expected by the trade.

While refined zinc is scarce, secondary smelters are buying more scrap. Zinc scrap is reported to be

selling above ceiling prices, some plants paying up to 5c. a lb. for old die castings. The ceiling for this type of scrap is 4.25c. a lb. after removal of iron, steel and other foreign matter.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic ¹	12.00
Copper, Lake	12.00
Tin, Straits, New York.....	*52.50
Zinc, East St. Louis ²	7.25
Lead, St. Louis ³	5.70

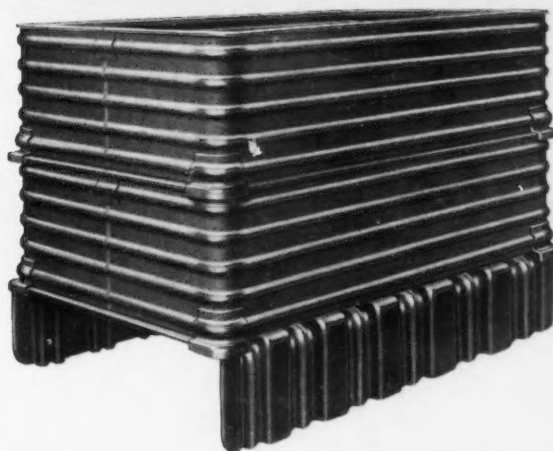
¹ Mine producers' quotations only, delivered Conn. Valley. Deduct $\frac{1}{4}$ c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery. * Average for week.

Other Non-Ferrous Prices

Aluminum, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. Nickel electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. Antimony, prompt, Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. Quicksilver, nominal. Brass Ingots, commercial 85-5-5-5, 13.25c. a lb.

UNION METAL STEEL SKID with DETACHABLE BOXES

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Flexibility
of Service



• Many manufacturing processes require both plain platforms and platform boxes. Union Metal steel skid platforms, equipped with detachable boxes, offer an economical solution. The skid platforms feature the double corrugated design for greater strength and more rigid support. The boxes are

equipped with lugs on sides and ends, and firmly welded corner boots, which permit them to be built up to any practical height.

Write for address of nearest sales office and copy of bulletin describing the Union Metal line of steel skids, boxes and pallets.

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Please send me bulletin describing Union Metal Corrugated Steel Boxes, Skids and Pallets.

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Company _____ Title _____
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SCRAP

... MARKET ACTIVITIES AND PRICE TRENDS

OPACS "Toys" With Idea of Licensing Scrap Steel Brokers

Washington

... Priorities on iron and steel scrap have been discussed informally at both OPM and OPACS and it is believed that old materials may be subjected to this form of control in the near future. OPACS also is reported to be "toying" with the idea of requiring that scrap dealers and brokers be licensed. While it was said that this plan will be put into effect ultimately, it was pointed out that so far consideration has not reached the "serious stage."

It is understood that on the whole the scrap trade would welcome priorities but that it is strongly opposed to a licensing system.

Such a system, designed to compel adherence to the price schedule, has been called "drastic" and dangerous on the ground that it could be used arbitrarily to put dealers and brokers out of business and make it difficult if not impossible for them to resume their business.

In the opinion of some defense officials and scrap dealers, priorities are inevitable. Their necessity, it is claimed, has heightened by reason of priorities placed on pig iron. It is contended that these priorities will sharply curtail, if not entirely cut off supplies. For this reason, the scrap trade generally is represented as feeling that if it is to channel adequate supplies of old material for defense purposes it must have priorities and subsequent allocation of tonnage.

It is freely admitted that the price structure of scrap has "de-

teriorated" recently. These reported violations of the price schedule are attributed to extreme pressure to get tonnage. Sales above the ceiling prices are said to be progressively increasing. Priorities, it is claimed, would be one form of enforcing price control. In addition it is said as a means of checking alleged violations the defense agencies are considering a plan requiring scrap buyers to report prices they paid for and sources of purchase of scrap.



... With the value of the OPACS price ceilings now being largely of sentimental rather than practical value, and with supplies of scrap steadily growing tighter and tighter, the scrap trade this week is looking to Washington for new moves to adjust the situation. In view of the cool reception afforded thus far to suggestions of trade authorities, there is a general inclination to leave the problem in OPACS's lap.

Such steps as licensing of brokers or establishment of priorities for scrap would be merely stop-gaps, it is asserted, and would not get at the root of the problem of increasing scrap supplies.

Meanwhile, pending passage of the price control bill by Congress, which will apparently give OPACS the teeth it has in the past asserted was already available from World War I legislation, the OPM is concentrating on rounding up all fringe supplies of scrap. Steps are being taken to scrap all abandoned or unused railroad and street car tracks, old auto scrapping is being steadily pushed.

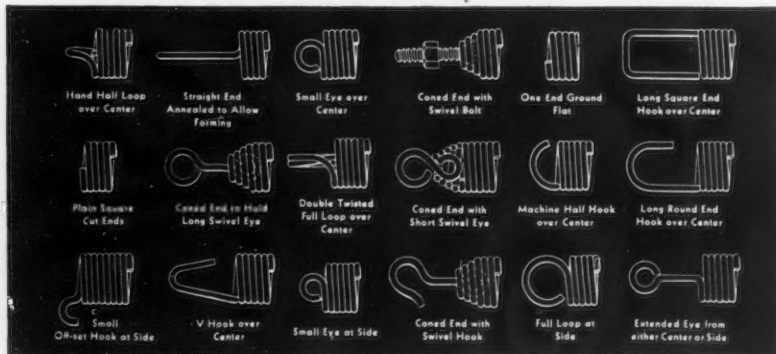
The amount of material expected from scrapping of railroad tracks is put at around 232,000 tons. This will, if it is all realized, ease the shortage in some directions, notably that of foundries, but will not go far in meeting the deficit in open hearth grades. Railroads are also being asked to dismantle and scrap all unused bridges, buildings, etc.

Use of community drives to bring in added supplies is gathering momentum, with the latest

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even a SPRING —**

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Make sure you get the right spring with the best loop or hook.

It pays!

Dunbar Bros. Co.

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

"Quality Springs since 1845"

Auto Plant Scrap Being Allocated

Detroit

• • • The practice of sending out a monthly list offering automotive production scrap has been discontinued by at least one of the major concerns here which formerly followed this practice. Fisher Body has not offered such a list in several months, it has been learned, since all prices bid have been the same on bundles, the major item sold by Fisher. Other concerns are still going through the formalities and, where they have some items that are not specifically listed by OPACS, there is justification for the lists. The practice being followed mainly consists of an allocation—selling to each bidder the proportion of scrap which experience showed had been his portion formerly.

Abandonment of the practice of issuing monthly lists has resulted in some negotiation, but for the most part the system of allocation prevails. Influence of steel mills will become much more important under this arrangement because the mills are working out more trades in which steel is not forthcoming unless the consumer returns scrap to the mill.

Philadelphia

• • • A local industrial producer of new bundled scrap has been following the policy of allocating each month's accumulation ever since OPACS ceilings removed the possibility of competitive bidding.

plant to sponsor such a drive being Andrews Steel Co., Newport, Ky. It is believed likely that such drives will be undertaken shortly on a nationwide basis.

Pittsburgh—Ceiling prices on some grades of scrap continued to be exceeded within the past week. However, within the past few days persistent reports that scrap would go under full priority control has cut down substantially the number of such transactions. Concentration now is on filling of orders taken within the past few weeks and so far efforts to pick up scrap have been no more successful than they have been recently.

Cleveland—One of the principal mills here has had increasing difficulty getting scrap recently and has dug deeply into its reserve. The other leading consumer

has adopted innovations which include the wrecking of an old Great Lakes passenger vessel which will yield considerable scrap.

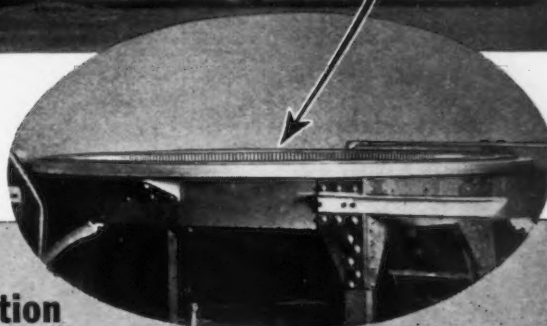
St. Louis—Receipts of scrap here continue light although sales of heavy melting steel without grade classification are being made at the No. 1 price, although the situation here is not yet serious. Mills continue to eat deeply into their reserve piles.

Buffalo—Shutdown of three General Motors plants in this district has cut off an important source of scrap. Present indications are that a crisis in the scrap metal situation may develop much sooner than was expected. One of the smaller steel plants here is reported ready to curtail operations because of insufficient scrap supplies while the area's largest steel producer, which usually has a winter reserve of 200,000 tons in its yards by Sept. 1st, had accumulated only 60,000 tons at most by mid-August.



Above — This American - La-France Ladder Truck Mounts Aerial Ladders 85 to 150 feet long.

Right—The Farrel Internal Ring Gear which Rotates the Ladder.



For Smooth Durable Operation American-LaFrance Aerial Ladders Use FARREL INTERNAL GEARS

To meet the demands of fire department service and be ready for instant emergency use the gears in an aerial ladder must be dependable, able to withstand heavy strain and operate smoothly and efficiently at all times. Because Farrel generated Internal Gears provide this dependability and rugged durability, stand up under the severest operating conditions, function smoothly and quietly, and make possible a more compact swing mechanism, they are standard equipment on this American-LaFrance aerial ladder truck.

The Farrel Internal Gear on this truck is located under the base of the ladder and is used to rotate the ladder when it is raised. This ring gear has 300 generated internal

teeth, 6DP, 1 1/8" face. Mounted on the truck chassis, it revolves on ball bearings.

Farrel Internal Gears are accurately generated in any size up to 18 ft. diameter, 12 in. face, 1 1/4 DP, with either spur or helical teeth. Internal gears frequently meet design and operating conditions better than other types. Because we can now furnish generated internal gears in large sizes it is now possible to obtain their advantages in many applications where they could not formerly be used due to size limitations.

We have unusual facilities for making internal gears and our engineers are available for consultation on applications involving their use.



FARREL-BIRMINGHAM COMPANY, INC.

333 VULCAN STREET - - - - - BUFFALO, N. Y.

The Gear with a Backbone

Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices, as revised by OPACS to Aug. 8, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points ➔	Pittsburgh	Johnstown	Warren	Youngstown	Sharon	Canton	Chicago	Kokomo	Bethlehem	Claymont	Coatesville	Phoenixville	Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	Portsmouth	Middletown	Ashland	St. Louis	Detroit	Duluth	Minneapolis*	Birmingham	Chattanooga	Radford, Va.	Worcester	Bridgeport	Phillipsdale, R. I.	Los Angeles	San Francisco	Seattle	Portland	Minneapolis, Cole.			
GRADES																																						
No. 1 heavy melting	\$20.00	\$20.00	\$18.75	\$18.25	\$18.25	\$18.75	\$18.75	\$19.25	\$19.50	.....	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	.....	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 1 hyd. comp. black sheet	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dealers' No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dealers' No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	.....	12.25	.....	15.00	13.00	13.35	15.50	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	.....	15.00	13.00	13.35	15.50	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shoveling turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	.....	.....	16.00	14.00	14.35	16.50	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.50	.....	19.00	17.00	17.35	17.50	16.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	15.25	13.25	13.60	13.75	12.75	.....	15.25	13.25	13.60	13.75	12.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Uncut structural, plate scrap	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	*19.00	20.00	20.50	21.00	20.00	20.35	*19.00	20.00	20.50	21.00	20.00	20.50	21.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	*17.50	18.50	.....	19.50	18.50	18.85	*17.50	18.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stove plate	19.00	19.00	18.00	18.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	*18.00	17.00	17.50	17.00	17.00	14.10	*18.00	17.00	17.50	17.00	17.50	18.00	17.50	18.00	17.50	18.00	17.50	18.00	17.50	18.00	17.50	18.00	17.50	18.00	
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	23.50	22.50	22.85	23.00	22.00	23.50	22.50	22.85	23.00	22.00
Low phos. bar crops, smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Low phos. pu'ch'gs., plate scrap ¹	24.75	24.75	23.00	23.00	22.50	23.00	23.00	23.50	23.75	.....	23.00	22.00	22.35	22.50	21.50	.....	23.00	22.00	22.35	22.50	21.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Machinery cast, cupola size ²	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.50	.....	22.00	21.00	21.35	*20.00	21.00	21.50	22.00	21.00	21.35	*20.00	21.00	21.50	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50
Punchings and plate scrap ³	23.75	23.75	20.75	20.75	20.25	20.75	20.75	21.25	21.50	20.50	19.50	19.85	20.00	19.00	20.50	19.50	19.85	20.00	19.00
Punchings and plate scrap ⁴	22.75	22.75	19.75	19.75	19.25	19.75	19.75	20.25	20.50	19.50	18.50	18.85	19.00	18.00	19.50	18.50	18.85	19.00	18.00
Heavy axle, forge turnings	21.25	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	18.00	17.00	17.35	17.50	16.50	18.00	17.00	17.35	17.50	16.50
Medium h'vy. el. fce. turnings	19.75	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	16.50	15.50	15.85	16.00	15.00	16.50	15.50	15.85	16.00	15.00

* This grade is 3/4-in. and heavier, cut 12 in. and under. * May include clean agricultural cast. * Under 3/4 to 1 1/4-in., cut 12 in. and under. * Under 1/4-in. to No. 12 gage, cut 12 in. and under. * Youngstown, Warren, Sharon and Canton are not basing points on this grade. * Middle-town price for this grade is \$15. * Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

Railroad Scrap (Per gross ton, delivered consumers' plants located on line of railroad originating scrap)

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that Chicago consumers of scrap originating from railroads operating in Chicago are permitted to pay as much as 84c. a gross ton in switching charges above the maxima.

Basing Points ➤		Pittsburgh	Sharon, Pa.	Wheeling	Steubenville	Youngstown	Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth	Middletown	Ashland	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Los Angeles	San Francisco	Seattle
▼ GRADES																									
No. 1 heavy melting		\$21.00						\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50			\$18.50	\$17.00	\$18.85	\$19.00	\$18.00	\$15.50		
Scrap rails		22.00						20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50			19.50	18.00	19.85	20.00	19.00	16.50		
Re-rolling rails*		23.50						22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00			21.00	19.50	21.35	21.50	20.50	18.00		
Scrap rails 3 ft. and under		24.00						22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50			21.50	20.00	21.85	22.00	21.00	18.50		
Scrap rails 2 ft. and under		24.25						23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75			21.75	20.25	22.10	22.25	21.25	18.75		
Scrap rails 18 in. and under		24.50						23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00			22.00	20.50	22.35	22.50	21.50	19.00		

* Relaying quality \$5 higher.

Explanatory Notes

(A basing point includes its switching district.)

MAXIMUM PRICE at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than \$1 for prices (for material other than railroad scrap) for the basing point nearest the consumer.

COMPUTING SHIPPING POINT PRICE: A shipping point is the point from which the scrap is to be shipped to a consumer. The maximum price at which a grade of scrap may be sold f.o.b. its point of shipment is the shipping point price of such scrap. A shipping point price is computed as follows: (a) For Shipping Points located within a Basing Point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this price the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For Shipping Points located outside a Basing Point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Then deduct from this price the lowest established charge for transporting scrap from the shipping point to such basing point. The figure thus obtained is the shipping point price. *Exceptions:* (1) The shipping point price at any shipping point in New England, of

those grades of scrap for which no prices are listed above shall be the Johnstown basing point price as set forth above, minus the all-rail transportation costs from the New England shipping point to Johnstown. However, the shipping point price at any shipping point in New England of those grades of scrap for which prices are listed at the basing points in New England shall be computed from those New England basing point prices; and (2) Shipping point prices for any shipping point in New York City, Brooklyn, New York, and New Jersey, which, by reason of barge rates, are nearest in terms of transportation charges to the Buffalo basing point, shall not be computed from the Buffalo basing point, but shall be computed from the Bethlehem, Pa., basing point.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is \$11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is \$2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than \$2.50 in transportation charges. Lowest established transportation charges will govern.

Non-Ferrous Scrap

(Dealers buying prices, cents per lb.)

	New York	Philadelphia	Pittsburgh	Cleveland	Detroit	Chicago
No. 1 heavy copper.....	10.75-11.00	11.125-11.375	10.25	11.00-11.50	10.00	10.50-10.75
Light copper.....	8.75-9.00	9.125-9.375	8.25	9.00-9.25	8.00	8.50-8.75
Heavy yellow brass.....	6.50-6.75	7.50-7.75	7.00-7.25	7.50-8.00	6.50	7.00-7.25
Light brass.....	5.75-6.00	6.50-6.75	6.00-6.25	6.00-6.50	5.75	6.50-6.75
No. 1 comp. turnings.....	9.50-9.75	9.50-9.75	9.00	9.50-10.00	8.50	9.00-9.25
New yellow brass clips.....	8.00-8.25	8.00-8.50	8.00-8.50	8.50-8.62½	8.625	8.50-8.625
Soft lead.....	5.25-5.50	5.25-5.50	4.75-5.00	4.75-5.00	4.50-4.75	4.75-5.00
Old zinc.....	4.00-4.25	4.25-4.50	4.00	4.00-4.125	4.50-4.75	4.25-4.50
Cast forged aluminum.....	12.00*	12.00*	12.00*	12.00*	12.00*	12.00*
Old sheet aluminum.....	12.50*	12.50*	12.50*	12.50*	12.50*	12.50*
Solder joints.....	8.75-9.00	9.00	8.00-8.25	8.00-8.50	7.00-7.50	7.50-8.00
No. 1 pewter.....	36.00-37.00	35.00-36.00	31.00-32.00	34.00-35.00	29.00-30.00	32.00-34.00

... Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

	Aug. 19, 1941	Aug. 12, 1941	July 22, 1941	Aug. 20, 1940
Flat Rolled Steel: (Cents Per Lb.)				
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302) ..	24.00	24.00	24.00	24.00

Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)				
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 120-124 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in the detailed price tables.

Pig Iron:

	Aug. 19, 1941	Aug. 12, 1941	July 22, 1941	Aug. 20, 1940
(Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$24.84
No. 2, Valley furnace....	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti... ..	24.06	24.06	24.06	23.06
No. 2, Birmingham.....	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†..	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa... ..	25.34	25.34	25.34	24.34
Basic, Valley furnace ...	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L .S. charcoal, Chicago... ..	31.34	31.34	31.34	30.34
Ferromanganese†	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.

Scrap:

(Per Gross Ton)				
Heavy melt'g steel, P'gh..	\$20.00	\$20.00	\$20.00	\$18.75
Heavy melt'g steel, Phila. .	18.75	18.75	18.75	19.75
Heavy melt'g steel, Ch'go .	18.75	18.75	18.75	18.50
No. 1 hy. comp. sheet, Det. .	17.85	17.85	17.85	17.25
Low phos. plate, Youngs'n .	23.00	23.00	23.00	21.75
No. 1 cast, Pittsburgh... ..	22.00	22.00	22.00	19.75
No. 1 cast, Philadelphia... ..	24.00	24.00	24.00	21.75
No. 1 cast, Ch'go*	21.00	21.00	21.00	16.75

*Changed to gross ton basis on April 3, 1941.

Coke, Connellsville:

(Per Net Ton at Oven)				
Furnace coke, prompt... ..	\$6.125	\$6.125	\$6.125	\$4.75
Foundry coke, prompt... ..	6.875	6.875	6.875	5.25

Non-Ferrous Metals:

(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*..	12.00	12.00	12.00	11.00
Copper, Lake, New York. .	12.00	12.00	12.00	11.00
Tin (Straits), New York. .	52.00	53.00	53.75	51.375
Zinc, East St. Louis.....	7.25	7.25	7.25	6.50
Lead, St. Louis	5.70	5.70	5.70	4.60
Antimony (Asiatic), N. Y. .	16.50	16.50	16.50	16.50

*Mine producers only.

... Composite Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
August 19, 1941.....	2.261c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One week ago	2.261c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One month ago	2.261c. a Lb.....	\$23.61	a Gross Ton.....	\$19.17	a Gross Ton.....
One year ago.....	2.261c. a Lb.....	\$22.61	a Gross Ton.....	\$19.00	a Gross Ton.....

	High	Low	High	Low	High	Low
1941.....	2.261c.,	2.261c.,	\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10
1940.....	2.286c., Jan. 2	2.211c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939.....	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938.....	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937.....	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936.....	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935.....	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934.....	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933.....	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932.....	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931.....	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930.....	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929.....	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 9

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (¹⁰)			3.37¢
TERNES, M'FG.															
Special coated, base box	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.80¢	2.55¢	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massilon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
									(Coatesville and Claymont = 2.10¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(¹¹)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)								3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
WIRE ⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)						2.92¢
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)						3.52¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
IRON BARS															
Common		2.25¢				(Terre Haute, Ind. = 2.15¢)									
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Rerolling \$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

3 in. to 12 in. \$52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)
Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem \$54.00

TOOL STEEL

(F.o.b. Pittsburgh)

High speed 67c.
High-carbon-chromium 43c.
Oil hardening 24c.
Special carbon 22c.
Extra carbon 18c.
Regular carbon 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00		
Brooklyn	27.50			28.00		
Jersey City	26.53	26.03	27.53	27.03		
Philadelphia	25.84	25.34	26.84	26.34		
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50		
Everett, Mass.	25.00	24.50	26.00	25.50		
Swedeland, Pa.	25.00	24.50	26.00	25.50		
Steelton, Pa.		24.50			\$29.50	
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	
Sparrows Point, Md.	25.00	24.50				
Erie, Pa.	24.00	23.50	25.00	24.50		
Neville Island, Pa.	24.00	23.50	24.50	24.00		
Sharpsville, Pa.*	24.00	23.50	24.50	24.00		
Buffalo	24.00	23.00	25.00	24.50	29.50	
Cincinnati	24.44	24.61		25.11		
Canton, Ohio	25.39	24.89	25.89	25.39		
Mansfield, Ohio	25.94	25.44	26.44	25.94		
St. Louis	24.50	24.02				
Chicago	24.00	23.50	24.50	24.00		\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00		
Cleveland	24.00	23.50	24.50	24.00		
Hamilton, Ohio	24.00	23.50		24.00		
Toledo	24.00	23.50	24.50	24.00		
Youngstown*	24.00	23.50	24.50	24.00		
Detroit	24.00	23.50	24.50	24.00		
Lake Superior fc.						\$28.00
Lyles, Tenn. fc.†						33.00
St. Paul	26.63		27.13	26.63		
Duluth	24.50		25.00	24.50		
Birmingham	20.38	19.00	25.00			
Los Angeles	27.50					
San Francisco	27.50					
Seattle	27.50					
Provo, Utah	22.00					
Montreal	27.50	27.50		28.00		
Toronto	25.50	25.50		26.00		

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

† Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.05	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled		4.10	4.05	4.05	4.60	4.30	4.30	3.68		4.24	4.35	4.23	7.30
Sheets, galvanized	4.75	4.60	4.62	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.52	3.46		3.61	3.83	3.54	
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.55	7.31	7.60	7.67	7.35	7.50		7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05		6.02	6.00	5.88	9.35
Bars, ed. drn. SAE 2300	8.15	8.15	8.40	8.56	8.84	8.70	8.40	8.63		8.77	8.84	8.63	11.35
Bars, ed. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23		7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations.

*12 gage and heavier, \$3.43. **Over 4 in. wide and over 1 in. thick, \$4.95.

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. per 100 lb.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

6 1/2 in., shorter and smaller	65 1/2
6 x 5/8 in., and shorter	63 1/2
6 in. by 3/4 to 1 in. and shorter	61
1 1/8 in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive	59
1 1/8 to 1 1/2 in. inclusive	57
1 5/8 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	64	
1/2 in. and smaller	62	
1/2 in. through 1 in.	60	
9/16 to 1 in.	59	
1 1/8 in. through 1 1/2 in.	57	58
1 5/8 in. and larger	56	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
---------------------	--------

Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes.

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld
	Cold Rolled	Hot Rolled
	\$	\$

2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2 1/2 in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3 1/2 in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

Steel (Butt Weld)

	Black	Galv.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	4.90c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate del'd Cleveland	6.25c.
No. 4 indus., del'd Cleveland	5.75c.
No. 6 indus., del'd Cleveland	5.00c.



PROTECTING 10 TON BUNDLES WITH *Faper!*



HOW **FIBREEN** SAVES TIME, MAN-POWER AND MONEY

NOT MANY YEARS AGO, steel sheets were shipped in box cars, laboriously loaded and unloaded by hand — for steel sheets have to be protected from rain and dirt in transit.

Then steel mill shipping experts, working with experts of The Sisalkraft Co., developed a method of banding bundles containing from 5 to 10 tons of sheets — wrapping them in tough, waterproof FIBREEN to provide the needed protection — and loading by crane into open gondolas. This method resulted in greatly increasing the speed of loading and unloading—reduced man-hours — made handling

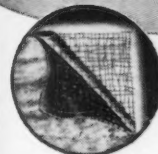
easier and more economical for both shipper and customer—and the steel is delivered in perfect condition.

That's just one example of Sisalkraft research in shipping problems.

There are similar "success stories" in the fields of furniture, automobiles, delicate electrical parts, carburetors, textiles and a host of other industries.

What do YOU ship? How do you package it? It may pay you to investigate FIBREEN. Outline your situation — we'll put our research department on the problem and send you a trial supply of FIBREEN without cost or obligation.

FIBREEN



FIBREEN is 6 ply: **TWO** layers of strong kraft, reinforced with **TWO** layers of crossed sisal fibers embedded in **TWO** layers of special asphalt — all combined under heat and pressure. FIBREEN is pliable and clean — will not scuff — stands an astonishing amount of abuse and exposure. FIBREEN is used either as a wrapping or a lining material.

Soak it — twist it — try to tear it!

Only when you get a sample in your own hands can you realize that a *paper* can be so strong — so tough — and impervious to moisture. There is no other material like FIBREEN. Available promptly in rolls and blankets of many widths. Write for sample.



FIBREEN is a product of The Sisalkraft Co. — also manufacturers of Sisalkraft, Sisal-X, Sisal-Tape and Copper-Armored Sisalkraft.



**THE
SISALKRAFT CO.**
205 W. WACKER DRIVE • CHICAGO, ILL.
NEW YORK • SAN FRANCISCO • LONDON • SYDNEY



SERVING INDUSTRY . . .

CONSTRUCTION AND AGRICULTURE THROUGHOUT THE WORLD

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads)...\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....\$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload, lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

(Per Gross Ton, F.o.b. Jackson, Ohio)

10.00 to 10.50\$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

(Per Gross Ton, F.o.b. Jackson, Ohio)

5.00 to 5.50\$28.50

For each additional 0.5% silicon up to 11%, 50c. a ton is added. Above 11% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon11.00c.
2 carbon17.50c.
1 carbon18.50c.
0.10 carbon20.50c.
0.06 carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon\$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... \$2.00

Ferrotungsten, 100 lb. and less \$2.25

Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†

Ferrocobalt, f.o.b. furnace, carload, contract, net ton.....\$142.50

Ferrocobalt, f.o.b. furnace, carload, contract, net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton..... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton..... \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Washington, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50... \$4.75

Old range, non-bessemer, 51.50 4.60

Mesaba, bessemer, 51.50..... 4.60

Mesaba, non-bessemer, 51.50... 4.45

High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn..57c. to 61c.

African, Indian, 49-51 Mn..60c. to 65c.

Brazilian, 46-48 Mn.....54c. to 59c.

Cuban, del'd, 51 Mn.....67½c. to 71c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered.....\$23 to \$24

Tungsten, domestic scheelite, delivered\$23.00

Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade).....Nom.

Rhodesian, 45\$25.00

Rhodesian, 48\$28.00 to \$30.00

*Importations no longer readily available. Prices shown are nominal.

COKE

Per Net Ton

Furnace

Connellsville, prompt ...\$6.00 to \$6.25

Foundry

Connellsville, prompt ...\$6.75 to \$7.00

By-product, Chicago\$10.50

By-product, New England....\$13.75

By-product, Newark..\$12.40 to \$12.95

By-product, Philadelphia\$12.13

By-product, Cleveland\$12.30

By-product, Cincinnati\$11.75

By-product, Birmingham \$8.50

By-product, St. Louis.\$10.75 to \$11.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60

lb., gross ton\$40.00

Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....\$40.00

Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes 3.00c.

Screw spikes 5.15c.

Tie plates, steel 2.15c.

Tie plates, Pacific Coast 2.30c.

Track bolts, heat treated, to

railroads 5.00c.

Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh,

Chicago, Birmingham; spikes and tie

plates—Pittsburgh, Chicago, Portsmouth,

Ohio, Weirton, W. Va., St. Louis, Kansas

City, Minneapqua, Colo., Birmingham and

Pacific Coast ports; tie plates alone—

Steelton, Pa., Buffalo; spikes alone—

Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5

f.o.b. Kentucky and Illinois

mines, all rail.... \$20.00 to \$21.00

Domestic, f.o.b. Ohio River land-

ing barges20.00 to 21.00

No. 2 lump, 85-5 f.o.b. Kentucky

and Illinois mines....20.00 to 21.00

Foreign, 85% calcium fluoride,

not over 5% Si, c.i.f. Atlantic

ports, duty paid.....Nominal

Domestic No. 1 ground bulk, 96

to 98%, calcium fluoride, not

over 2½% silicon, f.o.b. Illi-

nois and Kentucky mines.... 31.00

As above, in bags, f.o.b. same

mines 32.60

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

Per 1000

Super-duty brick, St. Louis....\$60.80

First quality, Pennsylvania,

Maryland, Kentucky, Missouri

and Illinois 47.50

First quality, New Jersey..... 52.50

Second quality, Pennsylvania,

Maryland, Kentucky, Missouri,

and Illinois 42.75

Second quality, New Jersey.... 9.00

No. 1, Ohio 39.90

Ground fire clay, net ton..... 7.10

Silica Brick

Pennsylvania\$47.50

Chicago District 55.10

Birmingham 47.50

Silica cement, net ton (Eastern) 8.55

Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plym-

outh Meeting and Chester...\$50.00

Chemically bonded, f.o.b. Balti-

more, Plymouth Meeting and

Chester, Pa. 50.00

Magnesite Brick

Standard f.o.b. Baltimore and

Chester\$72.00

Chemically bonded, f.o.b. Balti-

more 61.00

Grain Magnesite

Domestic, f.o.b. Baltimore and

Chester in sacks.....\$40.00

Domestic, f.o.b. Chewelah, Wash.

(in bulk) 22.00

BAKER TRUCKS give production at Bell Aircraft

A BIG LIFT



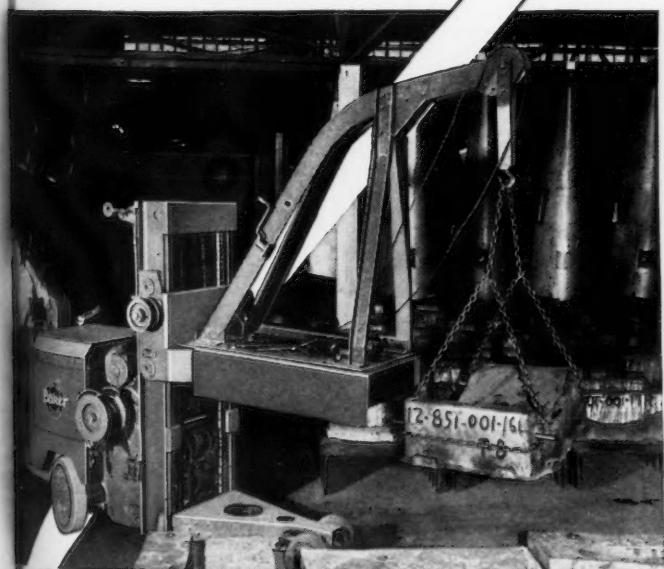
Bell Airacobra, U. S. Army's potent cannon-carrying fighter airplane—brought from the experimental stages to mass production in less than 300 days.



5-ton Baker Hy-Lift Truck changing dies in the Drop Hammer Dept. at Bell Aircraft Corporation's plant in Buffalo, N. Y.

★ ★ ★

Fast, dependable transportation of dies from storage to drop hammer is accomplished by this 3-ton Baker Hy-Lift Truck with crane.



A fleet of Baker Trucks is a factor in the amazing record of Bell Aircraft, which has brought its cannon-carrying fighter airplane, the Airacobra, from the experimental stages to mass production in less than 300 days... Every situation where faster production schedules are required — where plant capacity must be increased — where man hours are at a premium — call for Baker Trucks. The Baker-Raulang Company is working night and day to meet the demands of defense industries.

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INDUSTRIAL TRUCKS

in Canada: Railway and Power Engineering Corporation, Ltd.

SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

● **Westinghouse Electric & Mfg. Co.**, Page Boulevard, Springfield, Mass., has awarded general contract to T. A. Pearson Associates, Inc., 25 Harrison Avenue, for one-story extension to plant at East Springfield. Cost over \$75,000 with equipment.

Cone Automatic Machine Co., Inc., Windsor, Vt., automatic screw machinery and parts, plans expansion in plant for production of machine tools and parts for government, and will expend about \$350,000 for machinery and facilities, to be secured through Defense Plant Corp., Washington.

Narragansett Electric Co., 51 Westminster Street, Providence, R. I., plans new steam-electric generating station at Westerly, R. I., where site is being selected. Work will begin soon to have plant ready for service in late 1942. Cost about \$2,500,000 with turbine-generators, high-pressure boilers and auxiliary equipment.

New Departure Division, General Motors Corp., Bristol, Conn., steel balls, ball bearings, etc., will expand plant for production of aircraft parts for government, which will furnish fund of about \$2,442,000 for purchase of machinery, equipment and other facilities through Defense Plant Corp., Washington.

B. F. Sturtevant Co., 89 Broad Street, Boston, blowers and other mechanical draft equipment, air-conditioning apparatus, etc., has let general contract to R. R. Jacobucci, Inc., 16 Greenwood Avenue, Quincy, Mass., for three-story and basement addition, about 45 x 65 ft., to plant at Hyde Park, Boston. Cost close to \$55,000 with equipment.

Commanding Officer, Air Corps, Bangor, Me., plans expansion in present auxiliary air bases at Presque Isle and Houlton, Me., for main airfields for handling bombers and other aircraft for delivery to England, including hangars, machine and mechanical shops, gasoline storage and fueling systems, and miscellaneous buildings, with complete facilities for starting points for trans-Atlantic flights. Cost estimated at \$3,080,000 and \$2,418,000 for respective bases, in order noted. Appropriations in such amount will be arranged at once.

Robins Dry Dock & Repair Co., Erie Basin, Brooklyn, has let general contract to C. J. Moore, Inc., 285 Madison Avenue, New York, for one and three-story mill and shop addition, 150 x 500 ft.; single-story section will be equipped for storage and distribution of stock used for ship repairs; three-story portion will be equipped for electrical, metal-working and mechanical departments. Cost about \$1,000,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

American Forge Division, American Brake Shoe & Foundry Co., 230 Park Avenue, New York, upset steel forgings, etc., has let general contract to Deckert & McDowell, 53 West Jackson Boulevard, Chicago, for one-story addition to plant at 2631 South Hoyne Avenue, Chicago. Cost over \$50,000 with equipment. Benjamin F. Olson, 19 South LaSalle Street, Chicago, is architect.

Sullivan Dry Dock & Repair Corp., foot of 23rd Street, Brooklyn, plans expansion in shipbuilding and repair plant for repair and maintenance of vessels for government, including dock and shop facilities, with machinery, tools, mechanical-handling and other equipment. Cost about \$1,700,000 to be financed by Defense Plant Corp., Washington.

Acco Products, Inc., 24-02 39th Avenue, Long Island City, metal files, paper clips and other metal specialties, has let general contract to Birguglio, Schneer & Gaddy, Inc., 93-03 Sutphin Boulevard, Jamaica, L. I., for new two-story plant, about 50 x 100 ft., at 39-08

24th Street, Long Island City. Cost over \$65,000 with equipment. John M. Baker, 24-16 Bridge Plaza South, is architect.

Odenbach Shipbuilding Corp., Rochester, N. Y., care of John H. Odenbach, 323 Aberdeen Street, head, recently organized, plans new shipbuilding plant at Manitou Beach, on Lake Ontario, about 10 miles from city, for production of steel freighters for U. S. Maritime Commission, Washington, comprising shipways, outfitting dock, mechanical and other shops, storage and distributing buildings, and auxiliary structures. Cost reported over \$5,000,000. Government will provide funds for construction, which is scheduled to begin soon.

National Aniline & Chemical Co., 1051 South Park Avenue, Buffalo, industrial chemicals, dyes, etc., has let general contract to Metzger Construction Corp., 429 Carlton Street, for one-story addition. Cost close to \$60,000 with equipment.

Chevrolet Motor & Axle Division, General Motors Corp., Tonawanda, N. Y., is having plans completed by Albert Kahn Associated Architects & Engineers, Inc., Detroit, for one-story addition, about 250,000 sq. ft. of floor space, for aircraft engine-testing shop. Cost over \$650,000 with equipment.

Communication Products Co., 245 Custer Avenue, Jersey City, N. J., radio equipment and parts, has purchased two-story industrial building on local site at 361-65 Cator Avenue, totaling about 10,000 sq. ft. of floor space, and will improve and equip for plant.

Excel Foundry & Machine Co., Lebanon, N. J., grinding mills and kindred machinery and parts, iron castings, etc., has purchased former textile mill of Mechanics Mill Co., Fall River, Mass., recently held by city, and will remodel and equip for new branch plant. As part of purchase contract, company will expend \$50,000 for remodeling and improvements in property within 12 months.

Thermoid Co., Whitehead Road, Trenton, N. J., mechanical rubber products, brake linings, etc., has let general contract to Fowler-Thorne Co., 211 North Montgomery Street, for one-story addition, 100 x 200 ft. Cost over \$85,000 with equipment. Micklewright & Mountford, 224 East Hanover Street, are architects.

Air Cruisers, Inc., 330 Highland Avenue, Clifton, N. J., special type light aircraft and parts, plans new local plant for production of airplanes for War Department, Washington, consisting of main one-story structure and smaller adjoining units. Fund of about \$253,900 is being secured through Defense Plant Corp., Washington, for land, buildings and equipment.

Standard Pressed Steel Co., Stewart Avenue, Jenkintown, Pa., steel shop equipment, cap screws and other pressed steel products, has let general contract to Townsend, Schroeder & Wood, Inc., 1700 Sansom Street, Philadelphia, for two one-story additions, 80 x 100 ft., and 30 x 100 ft. Cost over \$65,000 with equipment. Widdicombe Engineering Co., 1700 Sansom Street, is engineer.

Sun Shipbuilding & Drydock Co., Chester, Pa., will expand shipway on neighboring site of 55 acres of waterfront property along Delaware River, Eddystone, acquired by government from Eddystone Mfg. Co. Work will include 12 new shipways and wet basins, outfitting docks, shops, storage and distributing buildings, and miscellaneous structures, equipped for construction of 16,000-ton steel oil tankers for government. New yard is reported to cost over \$7,500,000 with equipment.

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans two one-story additions to foundries at Trafford City, Pa., used for production of iron, steel and other metal castings for electric motors and other elec-

trical apparatus. Cost close to \$1,000,000 with equipment. Completion is scheduled by close of year.

Spicer Mfg. Corp., Pottstown, Pa., universal joints for automobiles and other automotive equipment, has let general contract to W. B. Zern, 216 Beech Street, for one-story addition, 100 x 220 ft. Cost about \$160,000 with equipment. Main offices are at Toledo, Ohio.

Quartermaster General, Washington, plans machine and mechanical repair shops for motor truck service, oil houses, grease racks and other automotive repair and maintenance facilities at eight military posts, including Camp Croft, S. C.; Camp Wheeler, Ga.; Fort Benjamin Harrison, Ind.; Camp Wolters, Tex.; Fort Crook, Neb.; Camp Roberts and Camp Callan, Cal.; and Fort Lewis, Wash. Cost about \$1,000,000 for buildings and equipment, and fund in that amount has been authorized.

American Hammered Piston Ring Division of Koppers Co., Bush and Hamburg Streets, Baltimore, plans new plant on local site for production of airplane engine parts for government, consisting of several large one-story units. Cost about \$1,250,000 with machinery. Funds will be secured through Defense Plant Corp., Washington.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 26 for six steam or air-driven forging hammers, for Charleston, S. C.; Mare Island, Vallejo, Cal., and other Western Yards (Schedule 8240); for anvils, punches, chisels, etc. (Schedule 8238), and for general purpose shovels and scoops (Schedule 8242) for Eastern and Western Navy Yards.

The South

● **American Cast Iron Pipe Co.**, 2930 North 16th Street, Birmingham, plans three-story addition for expansion in pattern shop and other departments. Cost close to \$100,000 with equipment.

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, has arranged with government for construction and operation of new plant near Bauxite (Saline County), Ark., to produce alumina. Plant will comprise several large one and multi-story production units, equipped for initial output of 200,000 tons per annum, with storage and distributing buildings, machine shop, administration building, power plant and other structures. About \$21,000,000 will be provided by Defense Plant Corp., Washington. Work is scheduled to begin soon.

Western Electric Cooperative, Inc., Cyril, Okla., plans new central steam-electric power plant on local site, for power supply for number of rural electric line associations in that district. Cost about \$500,000 with transmission lines for connection with different systems, switching stations and other operating facilities. Financing will be carried out through federal aid.

Chrysler Motor Parts Corp., 512 Spring Street, N. W., Atlanta, Ga., has leased one-story industrial building to be erected on Murphy Avenue, near Sylvan Road. Cost reported close to \$250,000 with equipment.

Gulf Refining Co., Gulf Building, Houston, Tex., plans new bulk oil terminal on Lake Ferguson, near Greenville, Miss., including several one-story buildings, four steel tanks with capacity of 1,500,000 gals., machine shop, pumping station and miscellaneous structures. Cost reported over \$85,000 with equipment. Main offices are in Gulf Building, Pittsburgh.

Gulf Power Co., North Palafox Street, Pensacola, Fla., plans new steam-electric generating station on local site, with initial capac-

BAN ON COATING METALS FORCES QUICK SUBSTITUTE

Important information for executives who must find a suitable replacement -- quickly for galvanizing or other metallic coatings.

WITH today's shortage of protective coating metals; zinc, tin, cadmium, and nickel, plant executives are facing immediate abandonment or at least careful conservation of them for only the most vital uses. Baked organic finishes hold the most reliable promise of permanent availability, and these can become an acceptable substitute only when the baking process is conducted under proper conditions. In this connection, Morrison experience dates back many years and into the hundreds of successful paint and japan-drying oven installations.

Briefly, here is what Morrison ovens offer you in the present emergency: 1. Moderate price based on offering standard units. 2. Prompt delivery due to this standardization plus the fact that materials are ready for immediate construction. 3. Foresight will be used in making oven recommendations so that they will have future productive uses when coating metals are again available. 4. Advice on material handling will be gladly given, based on wide experience in this problem. 5. Morrison ovens are outstanding for their uniform heat, precision control of both temperature and atmosphere, and correct ventilation, which are all necessities in good baking results. 6. These ovens have high fuel economy with either oil or gas, and occupy small space in proportion to their output.

We are prepared to give you the prompt service and intelligent cooperation the present situation requires, and urge that you get in touch with us immediately.



MORRISON ENGINEERING CORP.

5005 EUCLID AVENUE

CLEVELAND, OHIO

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ity of 20,000-kw. consisting of a turbine-generating unit, high-pressure boiler and auxiliary equipment and extensions in transmission lines. Company is arranging financing through sale of bond issue totaling \$3,600,000.

Pennsylvania Shipbuilding Corp., Beaumont, Tex., plans two-story and basement shop, storage and distributing building at shipway, 100 x 150 ft. Cost over \$80,000 with equipment. Steinman & Golemon, Liberty Building, are architects.

Houston Compressed Steel Corp., Houston, Tex., Max A. Byer, head, recently organized, has acquired four acres on Yale Street for new scrap metal works, comprising large one-story unit with hydraulic press and accessory equipment for compressing light scrap metals for baling and handling; also other smaller units, with power house and miscellaneous structures. Cost about \$100,000 with equipment. Work scheduled to begin at once.

Central States

● **Cincinnati Steel Castings Co.**, 3212 Spring Grove Avenue, Cincinnati, steel castings, has let general contract to H. & F. H. Hosea Co., 622 Broadway, for new one-story foundry and plant, 139 x 289 ft., on Alabama Street, near Spring Grove Avenue. Cost over \$175,000 with equipment. E. A. Gast Engineering Co., Hazen Building, is engineer.

National Acme Co., East 131st Street and Coit Road, Cleveland, automatic screw machines and screw machine products, plans plant expansion for production of machine tools for War Department, Washington, which will furnish \$488,000 through Defense Plant Corp., Washington, for purchase of machinery and tools.

Gent Machine Co., 5810 Richmond Road, Cleveland, machinery and parts, plans new one-story plant, 50 x 120 ft., on local site, with boiler house, 12 x 25 ft., adjoining. Cost over \$70,000 with equipment. J. L. Rodrick, 1850 Superior Avenue, is architect.

Chandler Products Corp., 1491 Chardon Road, Cleveland, cap screws, machine screws and kindred products, has begun one-story addition, about 60 x 140 ft., for which general contract recently was let to Sam W. Emerson Co., 1836 Euclid Avenue. Cost over \$65,000 with equipment. Ernest McGeorge, 9400 Quincy Avenue, is architect and engineer.

H. F. Busch Co., 1332 Vine Street, Cincinnati, meat packer, has asked bids on general contract for new one-story plant, 60 x 120 ft., on Paddock Road, Bond Hill district. Cost over \$50,000 with equipment. William W. Carlton & Associates, 1816 Central Parkway, are architects; W. C. Pistler, 4 West Seventh Street, is consulting engineer.

Westinghouse Electric & Mfg. Co., East Pittsburgh, will begin superstructure soon for one-story addition to electric refrigerator works at Mansfield, Ohio. Cost close to \$160,000 with equipment.

Interlake Iron Corp., 2401 Front Street, Toledo, Ohio, has begun construction of one-story addition for new sintering plant and expansion in other divisions. Cost close to \$250,000 with equipment. Main offices are at 332 Michigan Avenue, Chicago.

Southern Indiana Gas & Electric Co., 20 N.W. Fourth Street, Evansville, Ind., has let general contract to A. G. Ryan & Sons, Evansville, for addition to local steam-electric power plant, exclusive of equipment, which is being purchased separately. Cost reported over \$500,000 with equipment.

McQuay-Norris Mfg. Co., Ordnance Management Division, 818 Olive Street, St. Louis, will build additions to armor-piercing core plant now under construction. Several large one-story units will be built on adjoining site, requiring about 150 screw machines and machine tools. Additional fund of \$1,725,000 will be provided through Defense Plant Corp.

Shell Oil Co., Shell Building, St. Louis, has let general contract to C. F. Braun Co., Alhambra, Cal., for new toluene production plant at oil refinery at Woodriver, Ill., consisting of several large one and multi-story units to be equipped to process about 4,000,

000 gals. of toluene from petroleum per annum. Cost over \$1,000,000 with machinery.

Carter Carburetor Corp., 2840 North Spring Avenue, St. Louis, plans one-story addition. Cost about \$150,000 with equipment. Appropriation will be furnished through War Department, Washington.

Kansas City Power & Light Co., 1330 Baltimore Avenue, Kansas City, Mo., has let general contract to L. M. Denny Construction Co., Davidson Building, for one-story addition to service, repair and garage building, 60 x 160 ft., for company motor trucks and cars. Cost about \$75,000 with equipment.

Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., has let general contract to Austin Co., 16112 Euclid Avenue, Cleveland, for one-story addition for main foundry expansion. Cost over \$100,000 with equipment.

Packard Motor Car Co., 1580 East Grand Boulevard, Detroit, plans installation of additional machinery and equipment to increase production of marine engines, including parts and assembling, for government. \$150,000 will be provided for purchases by Defense Plant Corp., Washington.

Chevrolet Motor Division, General Motors Corp., Flint, Mich., has asked bids on general contract for one-story addition to branch plant at Bay City, Mich., 224 x 243 ft. Cost over \$500,000 with equipment. Albert Kahn Associated Architects and Engineers, Inc., Detroit, is architect and engineer.

Detroit Tap & Tool Co., 8432 Butler Street, Detroit, taps, gages, threading tools, etc., plans expansion in plant for production of gages for government with installation of additional machinery. About \$175,000 will be expended for tools and equipment. Company will secure funds through Defense Plant Corp., Washington.

Decker Screw Products Co., Albion, Mich., has begun two one-story additions for storage and distribution. Cost close to \$40,000 with equipment.

Auto City Plating Co., Inc., 3456 Denton Street, Detroit, plans rebuilding of metal-plating works recently destroyed by fire.

Quality Hardware & Machine Corp., 5849 North Ravenswood Avenue, Chicago, dies, tools, etc., has asked bids on general contract for two additions, one and two-story, 100 x 160 ft. and 30 x 50 ft., respectively. Cost over \$75,000 with equipment. Robert S. DeGolyer and Walter T. Stockton, 307 North Michigan Avenue, are architects.

Rite-Rite Mfg. Co., 1501 West Polk Street, Chicago, automatic metal lead pencils and kindred specialties, has let general contract to Schless Construction Co., 236 North Clark Street, for new one-story plant at Downers Grove, Ill., 100 x 200 ft. Cost close to \$65,000 with equipment. George H. Buckley, 664 North Michigan Avenue, is architect.

A. O. Smith Corp., 3533 North 27th Street, Milwaukee, pressed steel products, plans conversion of part of plant for production of aircraft parts for government, with installation of tools, machinery and other facilities for such purpose. Cost about \$2,760,000, with majority of fund to be expended for equipment will be financed through Defense Plant Corp., Washington.

Thilmany Pulp & Paper Co., Kaukauna, Wis., glassine, waxed, greaseproof and other processed paper stocks, has let general contract to Permanent Construction Co., 2712 North Holton Street, Milwaukee, for one and two-story mill addition, 70 x 300 ft. Cost over \$100,000 with equipment.

Collins Radio Co., First Avenue, N.E., Cedar Rapids, Iowa, radio equipment and parts, has let general contract to A. L. Jackson Co., 161 East Erie Street, Chicago, for one-story addition, 150 x 350 ft. Cost over \$250,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, Chicago, are architects.

Federal Cartridge Co., Foshay Tower Building, Minneapolis, plans new plant at New Brighton, Minn. Plant, to be known as Twin Cities Ordnance Plant, will consist of four main one-story units, each about 400 x 1200 ft., with large group of smaller adjoining buildings for shops, storage and distribution warehouses, power house and other structures.

Contract has been let to Foley Brothers, Inc., New York Building, St. Paul, for grading, roads, sewer and water installation, etc., and general award will be made soon. Cost about \$30,000,000 to be financed through Defense Plant Corp., Washington. Smith, Hinchman & Grylls, Marquette Building, Detroit, are architects and engineers; Toltz, King & Day, Inc., Pioneer Building, St. Paul, is supervising architect and engineer.

Western States

● **Lockheed Aircraft Corp.**, 1705 Victory Place, Burbank, Cal., bombers and other large aircraft, has let general contract to H. W. Baum & Co., 232 South Van Ness Avenue, Los Angeles, for three-story addition, about 30 x 134 ft., for expansion in assembling department, to be partly used for storage and distribution, and one-story extension, 80 x 100 ft., for machine shop. Cost over \$150,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects.

Doran Co., 63 Horton Street, Seattle, propeller wheels and kindred mechanical equipment, has let general contract to General Construction Co., 3840 Iowa Avenue, for one-story addition, 70 x 300 ft., to be equipped as a machine shop. Cost close to \$90,000 with equipment. Clare Moffitt, 5622 Eleventh Street, N.E., is architect.

Bureau of Reclamation, Denver, Colo., asks bids until Aug. 25 for one 7-ton gantry crane for raising and lowering drafttube bulkhead gates at Shasta hydroelectric power plant, Kennett Division, Central Valley project, Cal. (Specifications 1542-D); until Aug. 28 for one 15-ton gantry crane for similar service at Boulder power plant, Boulder Canyon project, Arizona - California - Nevada (Specifications 1545-D). Installation in both cases will be made by government.

North American Aviation, Inc., Inglewood, Cal., plans expansion in plant for production of military planes, including several one-story additions, with installation of assembling and other equipment. Cost about \$795,300 for buildings and equipment, to be furnished by Defense Plant Corp., Washington. This is an extension of earlier agreement with government, covering appropriation of \$2,300,000 for new plant and equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Aug. 26 for one 36-in. motor-driven metal circular saw (Schedule 8256), brass boat plugs (Schedule 8241) for Mare Island Navy Yard, Vallejo, Cal.; one 30-in. band saw, with complete independent self-contained motor-driven dust collector (Schedule 8246), two motor-driven universal precision toolroom machines, complete with equipment (Schedule 8261), for San Diego, Cal., Naval Station; until Aug. 28 for one internal-external hydraulic universal grinder (Schedule 8293); until Aug. 29 for one hydraulic surface grinder (Schedule 8307), two toolroom sensitive screw-cutting precision lathes (Schedule 8316), all motor-driven, for San Diego Yard.

Canada

● **Falconbridge Nickel Mines, Ltd.**, 25 King Street West, Toronto, has plans maturing for expansion in plant at Sudbury, Ont., comprising several large one and multi-story units. Cost close to \$1,000,000 with machinery.

Department of Munitions and Supply, Ottawa, will take bids soon on general contract for new shipbuilding and repair plant at Sydney, N. S., where waterfront tract has been selected, to include shipways, dock, mechanical and other shops, storage and distributing buildings, and auxiliary structures. Cost about \$750,000 with equipment.

McKenzie Aircraft, Ltd., Edmonton, Alta., airplanes and parts, has asked bids in general contract for group of one-story additions for expansion in parts production and assembling departments. Cost over \$1,000,000 with equipment. Allward & Gouinlock, 57 Bloor Street West, Toronto, are architects.